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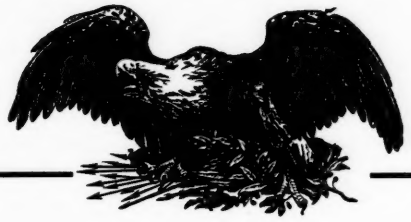
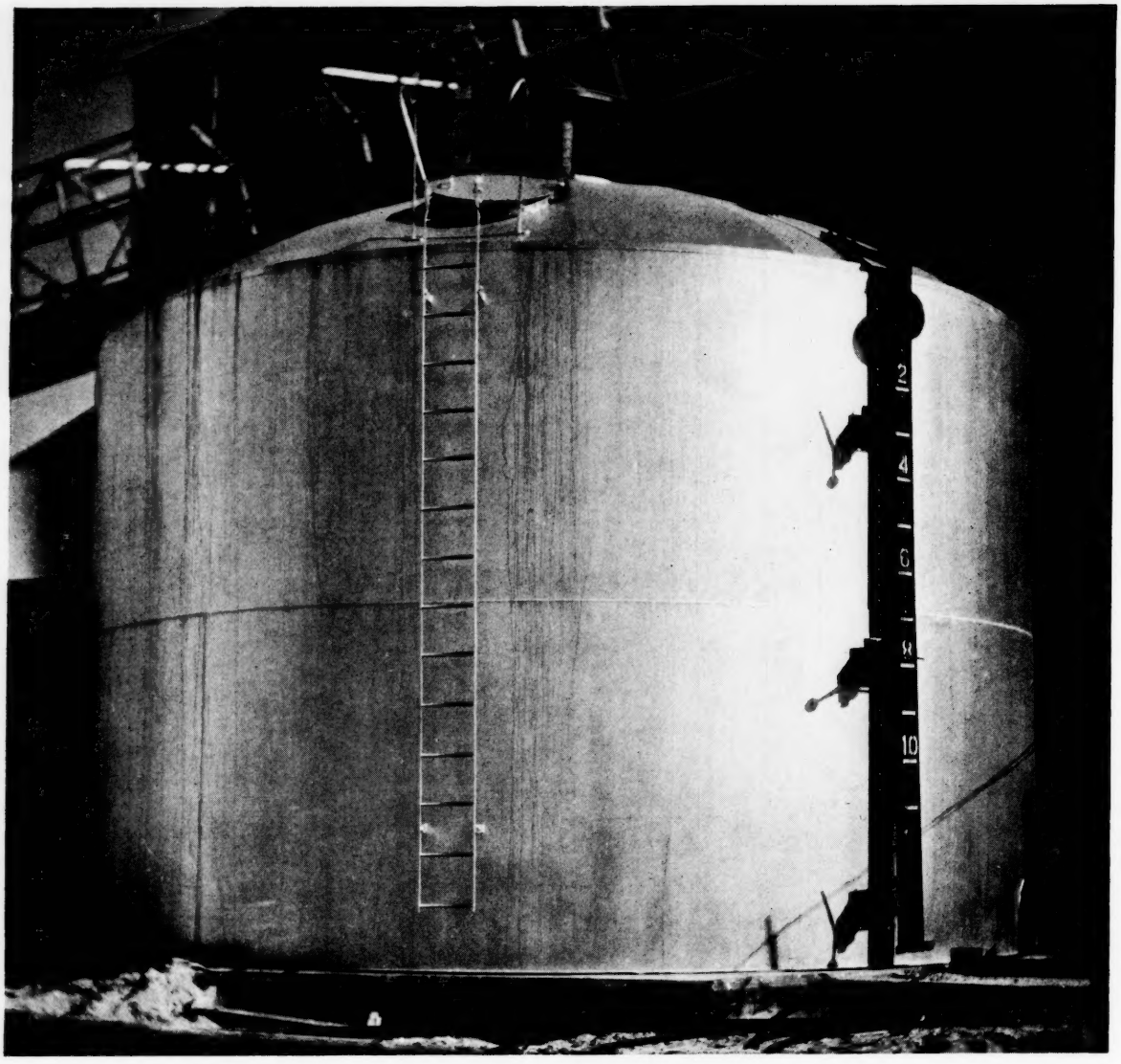


"Interferences with elections, whether of the State or General Government, by officers of the latter, should be deemed cause for removal."

—THOMAS JEFFERSON

From letter to Thomas M'Kean, dated
Washington, February 2, 1801

SEPTEMBER, 1938



WELDED STEEL TANKS

....at Southern Paper Mills

Steel tanks of welded construction are being used extensively at Southern paper mills to store water, acid and other liquids. The one illustrated above is 25 ft. in diameter by 15 ft. high and has a capacity of 55,000 gals. It is located at a new pulp mill in Brunswick, Ga.

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B-601

Plants in BIRMINGHAM, CHICAGO and GREENVILLE, PA.

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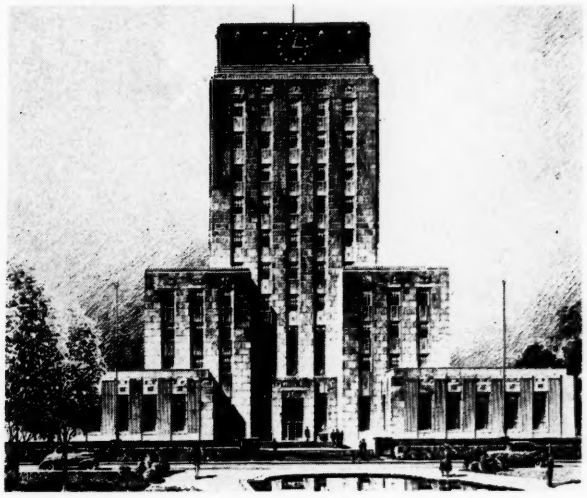

The new City Hall at Houston, Texas, as it will appear after construction

MANUFACTURERS RECORD

Devoted to the Upbuilding of the Nation Through the Development of the South and Southwest as the Nation's Greatest Material Asset

Published Monthly

by the

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Member A.B.C.

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"MADE WORK"

YOU hear lots about *made work* in "projects" these days.

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"The Facts" of the Economic Report

THE COMMITTEE of Southerners appointed by the President to prove that the South is the nation's No. 1 economic problem did its work quickly; so quickly in fact, that it gives rise to the suspicion the work was done before the public knew it had started; or that perhaps it was done in advance by others.

The report is largely made up of flat statements and generalities impossible to prove, and when figures are quoted they are selected with discrimination, the date sometimes being as old as ten years back if that suits the bias of the report better than later figures.

If the statement regarding Southern farmers' cash income from cotton and tobacco being two-thirds of the total cash farm income is taken as a sample of "the facts," then the entire report may be dismissed as unworthy of consideration. The total cash farm income of the South in 1937, according to U. S. Census reports, was $2,851,000,000, and of this the cash received from cotton and tobacco by the farmer represented only 33 per cent, and not 66 2/3 per cent as the report states.

That it is a biased report will be evident to those who know the South and the progress it is making. The impression is clearly given that the authors have gone out of their way to depict a deplorable state of affairs. Why?

For example: "In 1930 there were nearly twice as many Southern farms less than 20 acres in size as in 1880." All right, why not? The South, with its soil of great productivity, long growing season that permits three and four crops per year, can do more on 20 acres than other sections. Intensive farming has been preached up and down the land and is being practiced. Why shouldn't intensive work on smaller acreages be the correct thing to do? Smaller units that can be cultivated by one man have been urged for years as a progressive step. The reason for the statement contained in the reports, there is "less tillable land."

Granting the need of better farming methods not only in the South but in other sections of the United States, it is to be questioned if the figures "27,500,000 tons of nitrogen and phosphorous compounds are leached out of Southern soil and sent down the rivers to the sea" are provable by any facts in the possession of the Committee. Likewise is it to be questioned that "the South is losing more than $300,000,000 worth of fertile topsoil through erosion every year." This is guess work pure and simple and it will be interesting to know, even if such figures anywhere nearly approach the truth, what are the comparative figures for other sections.

"UNCONTROLLED flood waters likewise impose severe damages on the South." So they do elsewhere. "Much of its fertile farming land and many of its important cities lie within reach of floods."

"Vast sections of the alluvial valley of the Mississippi * * * with a population of more than 2,000,000, and numerous communities on other Southern rivers are in the danger zone. * * * Three-quarters of a million people were driven from their homes by the flood of 1927. Property damage from this flood was $220,000,000."

In view of the broad program being carried out by the engineers of the War Department, which has been exceedingly effective in protecting areas adjacent to the Mississippi, the purpose of citing the flood of eleven years ago when scientific preventive work has been carried out and been effective in later severe floods is not clear, nor is it understood why reference is made to this particular flood when worse ones have occurred subsequently and damaged other sections of the country to a far greater extent.

AGAIN it is stated that "illiteracy was higher in 1930 in the Southern states than in any other region," yet nothing is said about the fact that among whites illiteracy declined 45 per cent between 1920 and 1930, compared with only 25 per cent for the rest of the country, according to U. S. Census reports.

In the report considerable emphasis is placed on the farm tenant and farm mortgage problems. Replying thereto, Dr. G. W. Dyer, Professor of Economics at Vanderbilt University, says:

"Notwithstanding the statement of the President's Council that 'the mortgage debt of Southern farm owners has been steadily increasing for the last 20 years,' the records show that the mortgaged indebtedness of Southern farms wholly owned by their operators was reduced from $763,000,000 in 1925 to $711,873,000 in 1930. This was an average reduction of more than $10,000,000 a year for the five year period before the depression.

"While less than 31 per cent of the farms wholly owned in the South were mortgaged, over 42 per cent of the farms of this type outside of the South were mortgaged. The mortgaged indebtedness on farms of this type in the State of Iowa was greater than the combined farm mortgage indebtedness of Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas and Louisiana. The farm mortgage indebtedness of Wisconsin is greater than that of eight Southern states combined. The farm mortgage indebtedness of the two states of Kansas and Nebraska is greater than that of Virginia, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana and Arkansas combined.

"Farm tenancy is not a problem peculiar to the South. While the large negro population adds to the percentage of farm tenancy in the Southern states, farm tenancy is almost as extensive in leading agricultural states in the West as it is in the South. The percentage of all farms operated by tenants in certain states is as follows:

North Carolina	49.2 per cent
Iowa	47.3 per cent
Nebraska	47.1 per cent
Tennessee	46.2 per cent
South Dakota	44.6 per cent
Illinois	43.1 per cent
Kansas	42.4 per cent
Kentucky	35.9 per cent
Florida	28.4 per cent
Virginia	28.1 per cent

"The theory that the Southern farm tenant is crushed by economic conditions over which he has no control is completely exploded by the fact that negro farmers in large numbers in every Southern state have bought farms and paid for them under the economic conditions in the South. In 1930, 137,818 negroes were full owners of their farms in the South. These negro owned farms were distributed as follows:

Virginia	19,200
West Virginia	328
North Carolina	13,198
South Carolina	11,937
Georgia	9,014
Florida	4,357
Kentucky	3,056
Tennessee	5,687
Alabama	11,417
Mississippi	19,261
Arkansas	9,058
Louisiana	8,786
Oklahoma	6,550
Texas	15,968

"Of these farms wholly owned by negroes, 83,218 of them were absolutely free of mortgage. These mortgage free farms belonging to negroes had a value of $140,538,199."

WITH the greatest propaganda machine ever employed in the history of America, it is well for the administration to look to its facts before putting out statements that cannot be supported.

The MANUFACTURERS RECORD set forth in its August number the figures of the South's growth in comparison with the rest of the country. It has not been denied that the South has had a problem just as other sections have had theirs, but it is denied emphatically that the South is the nation's problem, or that it wants the nation to meddle in its affairs.

The political implication of the move is very clear and that makes it the more reprehensible. If the recipients of government bounty were denied the right to vote, as should be done, would the theorists of the New Deal be so keen about straightening out the "unbalance" which the South is said to create? As we are pointing out in another column, the *progress* the South is making is of grave concern to other sections which do not want to have Southern freight rates equalized with theirs. The statement has been made by the chief executives of various states that the industries of New England, and of New York and Indiana, will be thrown into confusion if the South's request for a parity of freight rates with other sections of the country is

granted. Its progress may be creating an unbalance, but not its poverty. The evidence is too clear to the contrary.

Freight Rate Hearing Admits South's Superiority

THE INTERSTATE Commerce Commission hearing at Buffalo of the South's request for railroad freight rates on a parity with other sections brought some interesting disclosures.

The arguments in opposition, on the part of New England governors, learned counsel, technicians, and prominent business men, admitted the superiority of the South as a processing region. They said New England had already suffered disastrous consequences from Southern competition and an equalization of freight rates would work further havoc to New England's industrial enterprises. The governors of New York and Indiana took similar ground as applying to the industries of their states.

The New England Council publishes a news letter, the latest number of which is given over very largely to "New England and the South before the Interstate Commerce Commission."

The South as an agricultural region, the letter points out, could trade with New England and New England could trade with the South. New England needed the South's agricultural products and the South needed New England's machinery. This was all very well and everybody was happy, particularly the New England mills which thought it economically all right to haul raw cotton 500 miles and have it processed by the skilled labor of New England states.

Now, however, with 70 per cent of the cotton spindles of the country in operation in the Southern states and 80 per cent of cotton takings manufactured in the Southern states, and vast chemical industries going South because of the advantages found there, and a variety of enterprises, that find it more profitable to go nearer to the site where raw materials and American labor are to be found, locating in Southern territory, the South must be penalized!

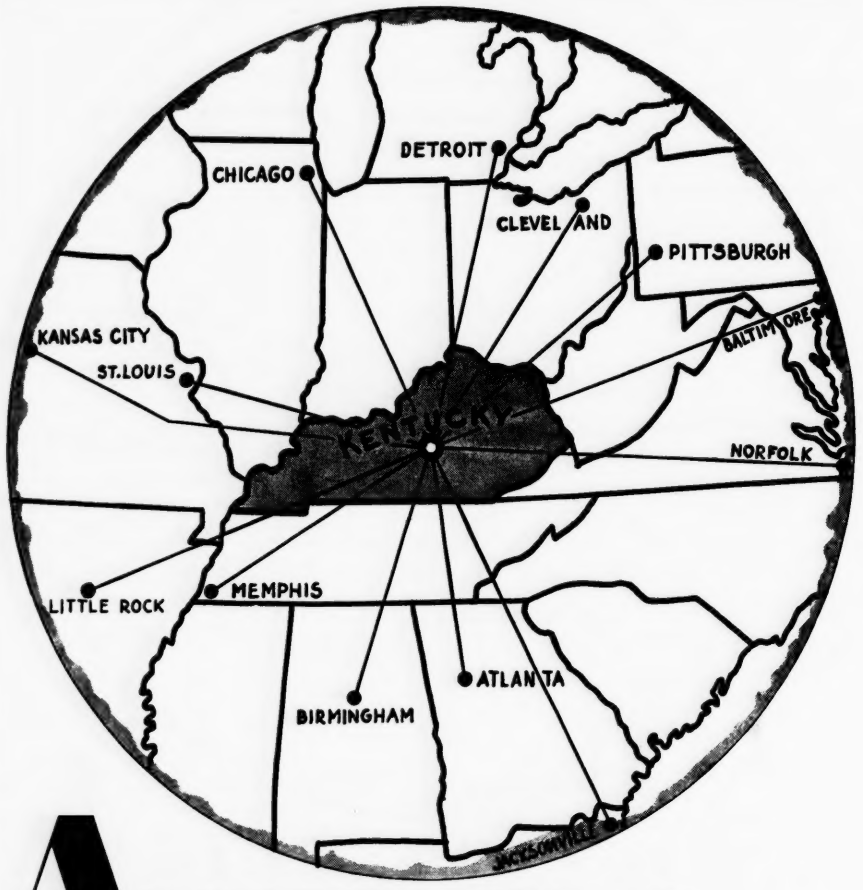
Yankee ingenuity, always heretofore to be reckoned with, which has surmounted so many obstacles in the past, is at a loss. New England can ship only a limited volume of agricultural products South, such as Irish potatoes and cranberries and as Professor Malcolm Keir says, these carloadings southbound are greatly inferior in tonnage to northbound products of the Southeast. New England can balance its inter-regional trade only by selling its manufactured goods to the Southeast. However, the Southeast is becoming industrially independent and is invading the New England markets as well as its home markets, and markets in the Midwest and Far West.

In the name of all that is right and proper why not? Has New England been so reduced in ideas that it sees nothing that will help it except the penalization of another section? Southern carriers, supposedly interested in getting as much freight income as possible, admit the justice of the South's claim, which is only that it shall be charged the same price per ton, per mile on the same kind of merchandise that the rest of the country pays.

We thought better of New England. Some months ago when the Governor of New Hampshire called a conference about this question of equalization of freight rates "to defend New England against the South," we stated such a conference for such a purpose was unworthy. The whole position is unworthy. The hearing brought out over and over again from witnesses of the North other admissions that may surprise those who thought of the South as the President described it, "the nation's No. 1 economic problem." These witnesses testified one after another as to the South's superiority until it would seem almost as if New England was about to usurp the doubtful privilege of being the nation's economic problem.

Will it be up to the South after all to show New England how it can succeed? Is the skilled labor of the New England states, which has come down from father to son for generations, now to be posed as helpless? Perhaps somebody in some Southern area will suggest that in that tradition which has taken a pound of brass at Bridgeport costing a few cents and made it into products selling for thirty dollars and more there will be found a way to greater progress.

Wouldn't it be far better for New England to cooperate with the South in its development, so that as the latter's manufacturing processes broaden along many lines the skilled workers of New England would find for their products a larger market here than ever before? Wouldn't New England prosper in the end by developing to a maximum the things that it can produce better than any other place, and cooperate with the markets that will take them? We repeat, the attitude of fear which New England has manifested is unworthy.



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There is more than 65,000,000 population (over half of the nation's total) in a 500-mile radius of Kentucky's center. It's the cream of the American market for most products.

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Kentucky—Rich in Material Assets

KENTUCKY, frequently referred to as the "Blue Grass" state, entered the Union in 1792. It is contended by some that La Salle was the first to discover Kentucky in 1669 when he passed down the Ohio River, while others state it was Marquette and Joilet in 1673 to whom the honor belongs. Regardless of whom the discoverer actually was, the first permanent settlement was not made till 1774, at Harrodsburg, though previous sporadic attempts had been attempted in earlier years. In 1775 colonization started in earnest with purchase of land from the Indians and after eventual ratification of the latter by Virginia (Kentucky at that time was considered part of Fincastle County, Virginia), immigration became strong in 1780. From that time on, the movement spread for Kentucky to separate from Virginia and become a soverign state. Virginia strongly opposed the suggestion and it was not till 1789 that remedial legislation was finally enacted to permit Kentucky to enter the Union in 1792.

Ranking 36 in size with a total area of 40,598 square miles of which 417 square miles are water area, Kentucky ranks 15 in population which amounted to an estimated 2,903,000 in 1937. The colored race comprise about 250,000 or approximately 9 per cent.

Climate

ALTHOUGH the topography of Kentucky is undulating and varied with mountains in some regions, the difference in elevation is not sufficient to cause any marked variation of climate. Kentucky is essentially temperate with abundant moisture.

The average annual temperature of 54° to 58° Fah. ranges from 71° to 80° Fah. in the summer months to 32° to 40° Fah. in the winter months. Below zero temperatures occur with moderate frequency in the eastern part of the state during December, January and February, but rarely occur in the west where the average for January and February is 33° to 38° Fah. The first killing frost usually comes between October 13 and 23 while the last killing frost is seldom later than April 20. The growing season ranges from 174 to 195 days.

The average annual precipitation of 40 to 45 inches is heaviest in the mountains and Cumberland river basin, being about five inches more than the state average. September and October are the driest months with a range of 2.5 to 3.5 inches. The remaining months average 3.5 to 5.5 inches.

Transportation

KENTUCKY is well provided with water transportation facilities, having approximately 5,000 miles of navigable rivers. With the Mississippi on the west and the Ohio on the north, more than half of the state's entire boundary is traversed with commercially navigable waterways. In addition, the Tennessee and Cumberland rivers are navigable for their whole length across the state while the river Green also is of considerable commercial and industrial value.

Kentucky has 8,300 miles of roads under state maintenance of which 6,350 miles are hard surfaced. Although the constitution of 1890 prohibited expenditure of state funds for highways, the development of roads done almost entirely by turnpike companies laid the nucleus of a system that has proved invaluable for the present expansion of linking the principal cities and other centers of industry and population.

The railroads operating in the state, which include nine class I companies, have an aggregate mileage approximating 4,000 miles. Although the South central section of the state is lacking in railroad facilities in comparison with other sections, virtually every region producing mineral commodities is adequately served by railroads which in some sections form a network of local and interstate concerns.

Two major air lines operating in the state provide constant service across the state and link it with almost every part of the country. Officially recognized air ports and fields are strategically located at 18 points throughout the state.

Manufactures and Finance

THE value of Kentucky's manufactured products amounted to $470,900,846 in 1935, a gain of $173,092,517 over the $297,808,329 in 1933. Of this amount liquors derived from the state's heavy corn and grain production and availability of limestone water, comprise the largest single manufacture with over $57,000,000. Flour and other grain mill products rank second with $17,432,326 and railroad repair shops are a close third with $17,022,352. Other important manufactures are dairy produce, cooperage and lumber products, meat packing, petroleum refining, and paints and varnishes.

In the 1,637 establishments located in the state there are 67,456 wage earners employed with a total payroll of $62,686,011. The cost of materials, containers, fuel, and purchased electric energy in 1935 was $470,900,846.

The total internal revenue collected in 1937 was $120,439,554 of which $18,519,505 represented income tax.

The aggregate resources of the state's 437 banks was $533,038,000 in 1937, a gain of $28,801,000 over the amount for 1936. The capital stock, including capital notes and debentures, of these banks totaled $38,412,000 while individual deposits were $444,625,000. Bank clearings of Kentucky as represented by reporting exchanges amounted to $1,881,872,000, an increase of $268,563,000 over the comparable transactions of 1936.

Agriculture

ALTHOUGH industrial development has been steadily and constantly increasing in Kentucky, the increased employment has been equalled by the rise of population and agriculture continues to occupy the largest single group, or about 40 per cent.

Agriculturally, Kentucky ranks as one of the most important of the Southern states, the cash farm income in 1937 being $162,459,000, representing an increase of more than $35,000,000 over the amount for 1936 which was exceeded by only two other states in the South. From the 5,513,200 crop acres in 1937, crops yielded a cash income of $88,822,000 while income from livestock and livestock products made up the remaining $68,477,000.

There are 278,298 farms in the state of which 148,985 are operated by the owners and only 65,236 are mortgaged, with a total mortgage indebtedness of $101,237,000.

The largest and most important single crop is tobacco and the 343,865,000 pounds produced in 1937 from the 410,000 acres harvested, yielded an income of $58,800,000. Kentucky is the second largest producer of tobacco, being surpassed only by North Carolina. Corn is also an important crop having yielded 75,556,000 bushels in 1937 while production of wheat was 10,212,000 bushels. Among other crops adaptable to industrial use are sweet potatoes, hemp, etc.

Livestock, products and dairy produce form an important part of Kentucky's agriculture. Livestock including cattle, sheep, swine, horses and mules number 3,769,000 and are valued at $105,725,000. Cows and heifers kept for milk number 551,000 and are the source of a cash farm income from milk of $28,407,000. Production of creamery butter last year exceeded 20,000,000 pounds valued at nearly $8,000,000 while more than 6,000,000 pounds of cheese were also produced. In addition, nearly 50,000,000 pounds of evaporated milk were processed besides several other processed milks and buttermilks.

Timber

ALTHOUGH Kentucky has an estimated 10,300,000 acres of forest land, the area of saw timber does not exceed 3,000,000 acres. The comparatively small available forest area is due in large measure to the extensive inner blue grass region where the fertility of the soil is such that vast areas are continuously employed for agricultural purposes. Also, the mining fields in the eastern and western parts of the state preclude any great forestation program.

The total lumber sawed in 1936, amounting to 194,684,000 board feet, included 167,509,000 board feet of hardwood and 27,175,000 board feet of softwood.

Hardwoods are the predominating species in Kentucky, the available timber stand consisting of approximately 6,000,000,000 board feet made up of over 5,000,000,000 board feet of hardwood and slightly less than 1,000,000,000 board feet of softwood.

In spite of the comparatively small quantity of timber, its quality is above the average. The average value per 1,000 feet of all lumber, at the mill, was $29.52 in 1936 compared with $23.75 for all Southern states and $22.20 for the entire country. Softwoods averaged $20.01 and hardwoods were $31.06 against the average of $27.92 for the whole United States.

While a large variety of woods are used commercially, the principal ones are chestnut, oak, yellow poplar, gum, hickory and beech.

According to the 1935 census, there were 146 establishments engaged in the lumber industry in Kentucky, the value of whose products totaled $5,594,000. The cost of materials and power used therein amounted to $2,206,000 and $1,447,000 was paid in wages.

Minerals

MINERALOGICALLY, Kentucky is one of the most important of the Southern states, ranking fifth in production value in 1936, the latest year for which statistics are available.

By far the largest part of the mineral production comprises coal, which totaled over 45,000,000 tons in 1937 and placed Kentucky fourth among the coal producing states of the nation.

Kentucky coal is of two kinds—bituminous and cannel—and is found mainly in two fields located at opposite ends of the state. Though bituminous is the most prolific, cannel is found in both fields and particularly strong beds are located in several of the eastern counties. While the varieties of coal differ in areas, possibly the greatest differential is that of sulphur content. In the eastern field all the coals are low in sulphur, seldom over three per cent, and the majority of commercial seams are less than one per cent. On the other hand, Dr. G. W. Burroughs, Assistant State Geologist of Kentucky, states that the lowest county average of sulphur content in the western field is 3.22 per cent. Coals of the western field, which cover nearly 5,000 square miles, have an average heat value of 12,000 B. T. U., while those of the eastern field, covering an area of over 10,000 square miles, have a heat value frequently approximating 14,000 to 15,000 B. T. U. Counties in which coal is commercially produced are indicated on the accompanying map, as are the other minerals so produced.

Great as is the production of minerals in Kentucky, nevertheless it is estimated that the average percentage of deposits of 24 minerals that are actively worked is less than 15 per cent. Coal and petroleum, each averaging 75 per cent, are not included.

Many of the minerals now produced are known to exist in commercial quantity other than in the deposits at present operated. Among these the following occur: asphalt rock, which is now produced in four counties, is available in at least seven others. Clays are among the most abundant of Kentucky minerals, over 340,000 tons valued in excess of $1,000,000 having been produced in 1937. In spite of that fact there are virtually unlimited quantities in untouched deposits, and the total supply includes varieties suitable for almost every clay-making purpose.

Coke, which is produced commercially on a large scale in only one county and is of the by-product variety, is available for production in numerous places from suitable coals.

Fluorspar deposits, which are the second largest in the United States, are confined to a comparatively few counties. Nevertheless, additional veins are known from those now being worked, and since these are a source of lead and zinc ores, their importance is obvious.

Limestone occurs in various forms in almost every county of the state, and though not all of it is of the building kind, inexhaustible quantities occur for other purposes. Sand and gravel also exist in many locations other than those now worked.

Besides the foregoing, there are a number of minerals available in sufficient quantity for commercial production, which are not now so produced or only in a desultory manner.

Aragonite, sometimes called Kentucky or Mexican onyx, exists in large deposits in and along the borders of several counties of the west. In the central part of the state, several counties contain veins of barytes in commercial quantity. Large quantities of marble are found in many counties, particularly adjacent to the Kentucky river where they outcrop. Marl, in the form of calcoreous shales and clays, is found in various localities and the deposits are described as enormous.

Carbon black was produced at several places for a number of years, but with extension of pipe lines, demand for natural gas for domestic and industrial use precludes its diversion for carbon black manufacture.

Large areas of iron ore are known to exist in the state, but their low grade has not yet occasioned any noticeable demand for commercial production.

A similar situation exists regarding the state's oil shale reserves, which have been conservatively estimated at 100 billion tons, and a content of one-half barrel per ton. These, and the inexhaustible quantities of impure limestones, offer unusual opportunities for the production of rock wool and other insulating products.

Phosphate rock, which has been mined occasionally in the past, occurs in considerable commercial quantity throughout the Blue Grass region, but its production is restricted by the agricultural value of the land.

Calcite, lithographic stone and ochre are three of the state's other minerals whose commercial possibilities need to be explored.

Electric Power

IN the matter of electric power generating facilities, Kentucky is so situated as to be able to supply virtually any reasonable demand that may come from expansion of industry.

While there are 20 companies operating 39 plants in the state, the main transmission lines form three principal groups. The one in the east supplies, through its vast network, power to a large portion of the mining industry and is connected with all adjoining states. The central system, supplying most of the larger cities, is also connected with the eastern and western systems. The system in the western part of the state includes the coal fields and other mining plants in its service.

Steam power plants, numbering 24, have an installed capacity of 228,253 kilowatts and the three hydroelectric plants, located at Louisville, Dix Dam and Dam No. 7 on the Kentucky river, have a combined installed capacity of 104,860 kilowatts. The remaining 12 plants comprise seven internal combustion engine plants, with 2,392 kilowatts, and five combination plants with 1,745 kilowatts.

Production of electricity in Kentucky during 1937 totaled 888,439,000 kilowatt hours. Of this amount, 580,244,000 kilowatt hours were produced by steam plants and 308,195,000 kilowatt hours were the output of water power plants.

Taxation

NO state provision has been made in Kentucky for industrial exemption from taxation. However, new industries may be exempted from city taxes for a maximum period of five years.

Manufacturing machinery, raw materials and intangible property (except franchise values) are exempt from all local taxes, being subject to state advalorem taxes only.

The state income tax applying to corporations is four per cent of the net income.

There is a corporation license which is a tax on every corporation owning property or doing business in Kentucky, except foreign insurance companies, banks and trust companies, and corporations which pay a franchise tax. The tax is 70 cents on each $1,000 of asset value of capital stock represented by property owned and business transacted in Kentucky.

The maximum tax rates which generally apply throughout the state are: counties, 70 cents; cities and school districts, 75 cents to $1.50 (graduated according to class). Assessment is based upon a fair cash value in a voluntary sale but indications are that a wide range of ratios prevail, the average being between 60 and 70 per cent. The assessed value of all taxable property is $2,525,181,891.

Labor and Wages

MORE than 70 per cent of Kentucky's population is rural. The average population density is 65 persons per square mile, ranging from 22 per square mile in Livingstone County to 918 per square mile in Jefferson County. Ninety-four of the state's 120 counties have a density less than the average. There are only 13 cities with a population between 10,000 and 70,000. Louisville's population is slightly over 300,000. Only .84 per cent of the people are foreign born and 87.8 per cent are natives of the state.

There is an ample supply of capable and willing labor for both skilled and unskilled work, nearly 17 per cent of the gainfully employed population being engaged in manufacturing (exclusive of mining).

Wages vary both with the industry and the locality. Common labor ranges from 25 cents per hour and organized skilled labor is $1.25 and up per hour. WPA hourly rates vary from 25 to 50 cents hourly for unskilled labor; 40 to 65 cents per hour for semi-skilled labor, and 60 to 75 cents per hour for skilled labor. In such instances as the building trade, the highest rate paid by WPA is $1.62½ in Campbell and Kenton counties.

KENTUCKY

Its principal raw materials and transportation facilities, with facts on the reverse side pertaining to its industrial growth and opportunities for industry.

Mineral—Counties in which mineral is commercially produced.

Asphalt rock—18, 64, 81, 108
Clay—21, 53, 55, 61, 103, 106
Coal—14, 21-22, 30, 38-41, 43-45, 56-58, 60-63, 70-72, 74-76, 79-80, 96-101, 106, 113-119
Coke—22
Fluorspar—34, 59, 77, 78
Glass sand—21, 48
Lead—59
Limestone—2, 3, 17, 19-21, 25, 27, 31, 33, 36-39, 42-47, 49, 51, 53, 55, 63-64, 66-67, 70, 72, 76, 91-92, 94, 96, 101, 104, 106, 108, 113-114, 118
Mineral water—23, 61
Natural gas—20-22, 38-42, 44-48, 55, 57-58, 60-63, 71-73, 75-76, 93, 98, 101, 106, 117
Petroleum—22, 29-30, 38-41, 44-46, 48, 54-58, 61-63, 72-73, 75, 79-80, 82, 91-93, 109-110, 112, 114-116
Pig iron—22
Sand and gravel—3, 10, 11, 21-23, 25, 44-46, 48, 76, 101
Sandstone—21, 38, 57
Zinc—59

Timber

Chestnut—13-15, 19-23, 28-31, 35, 37-42, 45-49, 53-58, 62-68, 70-76, 80-87, 91-101, 103-104, 107-119

Black Oak—all counties
White Oak—all counties
Hickory—all counties
Beech—1-35, 37-42, 45-87, 89-101, 103-120
Poplar— 1-5, 8-16, 18-26, 28, 30-31, 37-47, 49-52, 54-120
Maple—1-28, 30-40, 42-81, 83-103, 105-110, 112-120
Sycamore—2-5, 7-13, 15-20, 23-27, 31-39, 42-51, 53-57, 59-65, 67-70, 77-81, 83-96, 99-100, 102-111, 120
Gum—19-20, 33-34, 37-39, 42-49, 51-52, 54-61, 66-71, 76-79, 81-100, 102-109, 111-120
Basswood—1, 4-5, 10-13, 15, 18, 20-21, 23, 25-26, 28, 31, 33, 36-39, 45, 47, 51-55, 57-58, 62, 70-77, 91, 96-101, 106, 108, 117-119
Elm—1-7, 9-12, 15-19, 23-28, 31-37, 42-48, 50-52, 59-66, 69, 77-81, 84, 86-91, 93-95, 102-113, 120
Post Oak—15, 23, 31, 42, 46-50, 59-66, 77-82, 84-95, 102-113
Walnut—1-7, 9-12, 16-19, 24-28, 32-33, 35-37, 50-53, 66-71, 74-77, 80-81, 92-94, 97-101, 106-110, 118-120

Ash—1-4, 6-13, 15-21, 23-28, 31-39, 42-45, 47-53, 55-56, 58-64, 66-71, 73-81, 86-89, 93, 95, 97-101, 103-101, 106-120
Cedar—9, 11, 25, 31, 33-34, 36, 42, 48, 51-53, 64, 69-70, 81, 91-92, 95-96, 103, 112-111

Natural Gas is available for consumption in the following counties—1-3, 7-8, 14, 17, 22-23, 25-27, 30, 34-37, 39-41, 44-48, 53-54, 57-58, 60-61, 76, 78-79, 81-84, 91-92, 97-98, 100, 106, 108-110, 116-117

Railroads
Navigable Rivers
Airlines
Airports—also at principal cities printed in red

God-given Aids

FLORIDA • NORTH CAROLINA • GEORGIA • MISSISSIPPI • ALABAMA •
KENTUCKY • SOUTH CAROLINA • TENNESSEE • LOUISIANA
Atlantic Ocean
Gulf of Mexico

Governor Cross of Connecticut points out the Industrial Advantages of the South

At the recent freight rate hearing at Buffalo, Governor Cross of Connecticut, according to press reports, pointed to the natural advantages of the South such as the moderate climate, lower living costs, lower costs for fuel, food, clothing, and recreation as an argument against removal of discriminatory freight rates in the South because of "all these other advantages."

"The South has God-given aids which even the Interstate Commerce Commission cannot match," he stated.

YOU CAN'T beat geography. That American Industry is becoming increasingly aware of advantages offered by the Southeast is evidenced by its continued movement to this section. Here where the God-given climate is moderate the year 'round, less capital is required for construction—living costs are lower and therefore production costs are lower.

Diversified raw materials in ample supply, the reasonable attitude of native-born workers, the equitable power rates, and excellent transportation facilities all combine to make the Southeast an ideal industrial location. Investigate now.

WE, THE GOVERNORS . . .

WITH a view to aiding industrial expansion of our section and the stabilization of employment, we, the Governors of the Southeastern States, set forth the following objectives: 1. Equitable freight-rates as affect the Southeast. 2. Uniform taxation policies. 3. Friendly labor attitude between employer and employee. 4. Cooperation with Federal Government on proper major policies affecting industrial development. It will be our aim by working together on these objectives to maintain conditions favorable to sound industrial development so that the Southeast will reap the full benefits of the ever-increasing trend toward Industrial Decentralization and gain a proper balance between Agriculture and Industry.

Southeastern Governors Conference

LAWRENCE WOOD ROBERT, JR., *Executive Director, Bona Allen Bldg., Atlanta, Ga.*

Old and new bridges of Louisville & Nashville Railroad over the Ohio River at Henderson, Ky.

Kentucky is Favored Field for Railway Purchases

RAILWAY purchases, payrolls and taxes exert a powerful influence upon the economic life of Kentucky. Few states have a greater stake in railway prosperity. Few states are more directly affected by the rise and fall of railway earnings.

Kentucky ranks fifteenth among the states of the Union in population, twenty-second in value of manufactured products, and twentieth in cash farm income, but it ranks twelfth in railway purchases and fourteenth in railway employment.

Nineteen thirty-seven was far from a satisfactory year in the railroad business. Traffic was light and earnings were low. Yet, for every day of 1937 the railroads spent $200,000 in Kentucky. Every five days the people of Kentucky received the benefit of $1,000,000 from the railroads for fuel, materials, supplies, labor, taxes and miscellaneous services. Total railway expenditures in Kentucky for all purposes last year exceeded $72,000,000.

Numerous Kentucky firms and thousands of Kentucky workers are engaged in supplying the various needs not only of the railroads which operate within the boundaries of the state, but also of many railroads in other parts of the country.

A recent survey of railway purchases conducted by *Railway Age* developed the fact that no fewer than eighty-three railroads made important purchases in Kentucky in 1937. Of these railroads, three are located in New England territory, eighteen in Great Lakes territory, thirteen in Central Eastern territory, four in Pocahontas coal territory, fifteen in Southern territory, eleven in Northwestern territory, eleven in Central Western territory, and eight in Southwestern territory. A further analysis of the survey disclosed that, of the eighty-three railroads which reported purchases in Kentucky last year, fourteen operated mileage in the state and sixty-nine were located entirely outside the state.

Because of its extensive coal deposits, its hardwood forests and its many and varied manufacturing enterprises, Kentucky is an important source of supply for railroads in all parts of the country. A railroad prefers to patronize industries local to its territory; hence, as one would expect, the leading customers of Kentucky industries are the railway systems which operate in the state. Some idea of their importance as local buyers may be gained from the fact that aggregate purchases of fuel, materials and supplies by nine Class I railroads operating in Kentucky in 1937 totaled $15,068,000. Other railroads, resident and non-resident, reported purchases in Kentucky totaling $3,587,000 last year. However, these figures, totaling $18,655,000, by no means represent all of the money which the railroads spent in Kentucky during the year for fuel, materials and supplies. Several important railroads and many smaller railroads are not included. Moreover, expenditures for such items as electricity, water, telephone and telegraph service, laundry service, office rental and advertising are not included in the figures. Nor do the foregoing figures include purchases of materials and supplies by non-operating companies closely allied to the railway industry, such as the refrigerator car companies, the Railway Express Agency (owned by the railroads) and the Pullman Company. The Pullman Company's 1937 expenditures in Kentucky for materials and supplies amounted to $116,937.

It is conservatively estimated that the total expenditures in Kentucky of the railway transportation industry last year for fuel, materials, supplies and miscellaneous services was in excess of $22,000,000.

Railway purchases are not confined to a few of the leading commercial and industrial centers of Kentucky, but are widely distributed through the state. This is evidenced by the fact that some, but not all, of the railroads reported important purchases last year in 377 cities and towns located in 102 of the state's 120 counties, as graphically shown on the accompanying map.

Bituminous coal heads the list of items on the railway shopping list in Kentucky. Ranking fourth among the states of the Union in coal production, Kentucky is one of the principal sources of fuel supply for the railway industry. Due to business conditions and other factors, there have been wide variations from year to

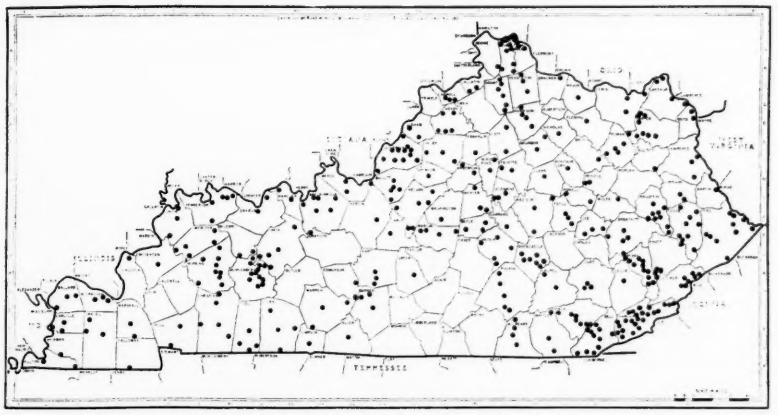
year in the quantity of coal consumed by the railroads. During the period immediately prior to the depression, it is estimated that the railroads were consuming around 15,500,000 tons of Kentucky coal annually. With railway activity at a low ebb in 1933, estimated purchases of Kentucky coal dropped to slightly more than 8,000,000 tons. With business somewhat improved in 1936, it is estimated that railway consumption of Kentucky coal increased to slightly more than 10,000,000 tons.

Thus, the fortunes of Kentucky's coal industry are closely linked with the fortunes of the railway industry. When railway business is good, the mines and mine workers of Kentucky are kept busy supplying railway needs.

Statistics show that every time a locomotive-mile is added to railway freight service, railway consumption of coal is increased by 189 pounds. Every time a passenger locomotive-mile is added the railroads buy 91 additional pounds of coal. Small wonder that Kentucky is a friend of the railroads.

Forest products rank second in importance to coal on the railway shopping list in Kentucky. Railway purchases of hardwood cross ties, switch ties, hardwood lumber, and other forest products in the state run into large figures. Complete figures are lacking, but it is known that last year, when the railroads as a whole spent 37 per cent less for additions, betterments and maintenance than in 1929, two railroads paid out more than $1,400,000 in Kentucky for forest products.

As in the case of coal, the railway market for forest products fluctuates with the rise and fall of railway earnings. When earnings are good, railroads buy heavily to catch up on maintenance and to make needed improvements. From 1924-1929, when the railroads of the country as a whole earned better than 4 per cent on their investment, they spent an average of $172,000,000 annually for forest products. During the depression period their expenditures for such products dropped to an average of $58,500,000 annually, based upon the period 1931-1935. With a slight improvement in earnings in 1936-1937, their purchases of forest products increased to $91,000,000 annually. While the foregoing figures are for the country as a whole, they point to the important stake which the forest industries of Kentucky have in railway prosperity. The same is, of course, true of numerous other Kentucky industries which are engaged in supplying the needs of the railroads.



In Kentucky the railroads purchased materials and supplies in 377 cities located in 102 of the 120 counties in the state

In addition to their purchases of bituminous coal, cross ties, bridge timbers and hardwood lumber, railway purchases in Kentucky include ballast materials, sand and gravel, and a wide variety of manufactured products, including structural iron and steel, brass and bronze castings, fuel oil, gasoline and other petroleum products, machinery, tools, hardware, arch and fire brick for locomotives, cement, chemicals, paint, asphalt, mill supplies, crossing gates, oxygen, acetylene, cotton waste, pulleys and parts, ball cords, tool handles, air filters, levee bags, signal materials, electrical supplies, automobile parts, cigarettes, cigars, liquors and food products for dining cars, cotton goods, printing, stationery and office supplies.

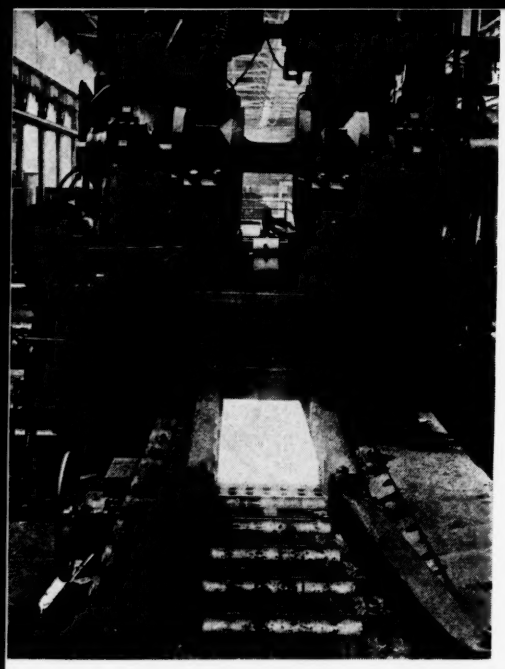
A substantial part of every dollar which the railroads spend in Kentucky for fuel, materials and supplies goes to pay the wages of Kentucky workers, to purchase raw materials from other industries, enabling them in turn to employ more workers, and so on. Thus these railway dollars help directly or indirectly to maintain the payrolls of numerous industries throughout the state.

Important as railway purchases are, they are by no means the only contribution the railroads are making to the economic well-being of Kentucky. Railroads are among the largest property owners and taxpayers in Kentucky. Their property taxes help to support the state government and the many state institutions. They help to defray the costs of city, town and county governments throughout the state. Last year the railroads paid state, county and local taxes in Kentucky totaling $5,109,000. This was equivalent to $1,338 for every mile of railroad in the state. A large part of the railway tax dollar goes to support the public schools. An analysis of 1931 taxes and government costs revealed that 44.2 per cent of all taxes paid by the railroads in Kentucky in that year was spent for public education. Omitting social security taxes amounting to $1,231,000, on this basis approximately $1,714,000 of Kentucky's 1937 railway taxes were used for

(Continued on page 56)

Left—Scene in the yards of the Louisville & Nashville Railroad; over 27,000,000 tons of coal were hauled in 1937 by this railroad. Center—Loading seasoned cross ties before being put in treating cylinders. Right—Loading coal on the Chesapeake & Ohio Railroad

Production of Tin Plate Under Way at Birmingham



The hot slab of steel about to pass through the three-high reversing universal roughing mill reducing it to about 60 feet long and one inch thick

THE new tin plate mill of Tennessee Coal, Iron and Railroad Company, at Birmingham, Alabama, the Southern subsidiary of United States Steel Corporation, is now operating at approximately 50 per cent of its annual capacity of 200,000 gross tons.

Eighteen months from the day ground was broken for the new plant, a construction project which required excavation of 1,100,000 cubic yards of dirt and rock, certain units were in operation. Late in June, 1938, construction was more than 99 per cent complete, and sheets of tin-plated steel were being sent in carloads to all parts of the Southern and far Western sections of the United States.

Buildings of the new plant, into which went 25,000 tons of structural steel, cover an area of 22 acres. The over-all length of the plant is 4,682 feet. To produce only the steel for its capacity tonnage, 1,223,000 gross tons of raw material will be required—589,000 gross tons of ore, 535,000 gross tons of coal, 73,000 gross tons of dolomite, and 26,000 gross tons of limestone. These requirements made it necessary for expansion in the company's mining and coke producing operations. Two new batteries of coke ovens, each with a capacity of 1,100 tons per day, were constructed. Inasmuch as all units of the plant are motor-driven, the company's electric power load was increased to meet a new demand for a total of 125,000 connected horsepower.

Additional work was provided for 3,000 employes in the new mills, the mines, furnaces, and offices.

The first shipment of tin plate manufactured South of the Ohio river left Birmingham March 10. Since then, shipments have increased steadily.

Two shipments of about 4,000 tons each have been moved by water from Mobile, Alabama, to Pacific Coast points. They were sent from Birmingham to Mobile, where the cargo was picked up by westbound Isthmian Lines vessels.

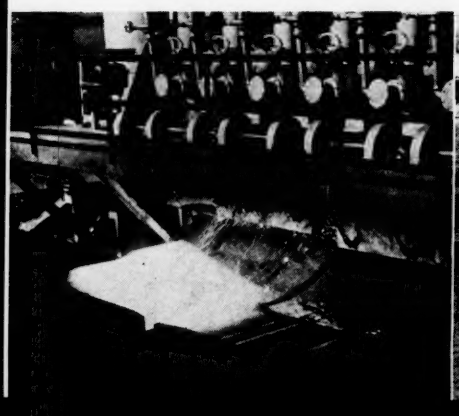
Pig tin used by T. C. I. comes from the Malay Peninsula. Palm oil, used in the cold reduction and tinning operations, is imported from Africa. But the majority of materials comes from within a 10-mile radius in the Birmingham area, where all the ingredients of steel are available.

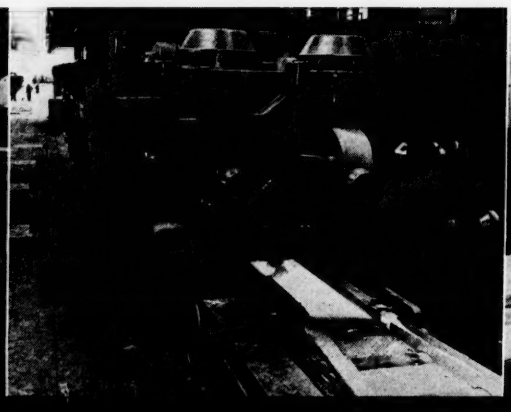
Tracing the course of material from steel slab to finished tin plate, the slab moves through one of three new continuous re-heating furnaces, through a vertical edger and into a 42-inch three-high universal mill, where several passes are made. Emerging, the slab has been elongated to a strip of some 80 feet in length and three-quarters of an inch in thickness. Roller tables take the strip to a two-high mill known as the scale-breaker. This breaks the scale and assures uniform speed of the metal through a water spray of 1,300-pound pressure, which removes the loose scale. The strip then passes through six stands of 48-inch four-high mills and is run out a distance of 400 feet to one of two coilers, where it is coiled hot and deposited in a vertical position on a slow moving chain conveyor about 1,000 feet long. This links the hot strip mill to the cold reduction department. The conveyor serves as a means of both transferring and cooling the hot coils.

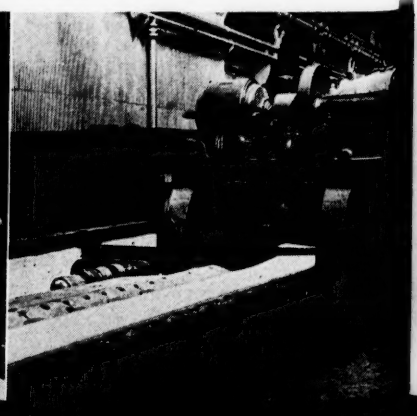
Pickling, or cleaning, is the next step. Two units, each 500 feet long, are used. Each consists of an uncoiler, stitcher, hot sulphuric acid tank, wash tank, pinch roll, shear and coiler. They operate on a continuous basis, with the strip about to be cleaned being stitched to the rear end of the strip actually in the cleaner. The stitching is sheared out at the end of the pickling line before the re-coiling operation.

The coiled strip moves next to one of two units of cold reduction mills. Each of these consists of five stands of four-high mills set in tandem with a tension reel following the finishing stand. Although the material is rolled cold, elaborate means are necessary to dissipate heat generated in this reduction process. Should the mill be allowed to run dry for the shortest length of time, the strip would soon reach white heat and actually burn. A palm oil solution is liberally applied during the cold reduction process. The steel enters the cold reduction mills

Left—The doors of the re-heating furnace open to discharge the hot slab onto the roller table. Center—The two-high mill scale breaker shatters the scale and insures uniform speed of the strip through the hydraulic water spray. Right—After leaving the universal mill about one foot of the front and rear end of the strip is sheared off







at a thickness of about .07 inch and emerges at approximately .0107 inch. Its length, as the strip is re-coiled after cold reduction, is about 5,600 feet. The strip is now coated with a film of oil, which must be removed before being annealed. This is done by passing it through a continuous cleaner which removes the oil electrolytically and scrubs and dries the metal. There are four of these electrolytic cleaners. The strip again is coiled after this operation.

At this stage, the strip is very hard and stiff. Annealing is necessary to soften the steel and remove the rolling strains and stresses. Radiant tube annealing furnaces—36 covers and 108 bases—are provided for this purpose. The cycle of operation is about 36 hours, heating and cooling.

After annealing, the softened coil is given one pass through one of five tempering mills. Each of these is composed of two four-high mills set in tandem and provided with reels on both entry and delivery side. Although never more than four per cent reduction is done in the tempering operation, very heavy and stiff mills are required to insure accuracy. Cooling, therefore, is not necessary, and the rolls are run dry.

The coil moves next to the shearing lines, where it is uncoiled for the last time. Each of the eight shearing lines consists of an uncoiler, a rotary shear for trimming the side scrap from the strip as it is uncoiled, a flying shear which cuts the strip into any length desired while in motion, an assorter and a stacker. The assorter is an automatic device which gauges the thickness of the sheet with a flying micrometer, throws the under-gauge in one pile and the over-gauge in another, and allows only the sheets of the proper gauge to pass through to the stacker.

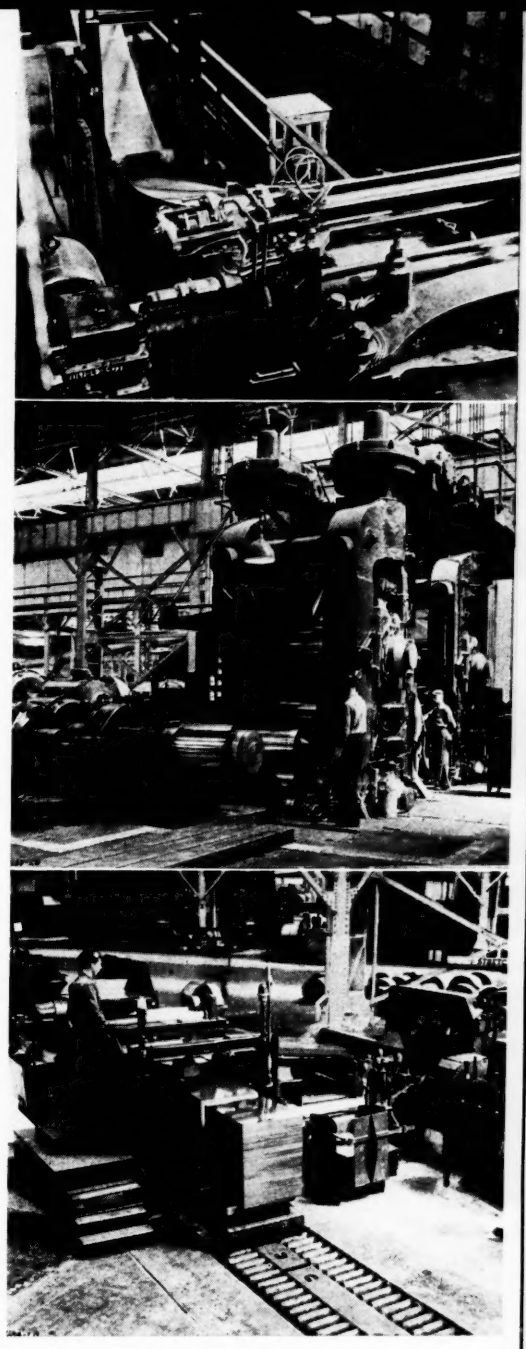
White pickling is the next step. This is the final cleaning operation before the steel is coated. Two units of plunger type picklers are provided. Sheets are placed on racks and immersed for a short time in a weak solution of sulphuric acid, then rinsed in clean, cold water. White pickling removes any oxide that might have formed on the plate by exposure to the atmosphere in previous operations. After washing, the plates are immediately placed in a bosh of water to which a small amount of hydrochloric acid has been added. This permits the plate to remain in the bosh for several days without surface oxidation or other injury.

From the bosh, the thin steel plates go to the tinning stacks, where tinplating takes place. Twenty-eight tinning stacks are provided, each consisting of a pot holding molten tin, a furnace to heat the pot, a tinning machine which conveys the plate through the molten tin, and a cleaning and polishing machine. The tinning pot has a partition in the center extending below the surface of the molten tin, but not to the bottom of the pot. A plate going into the pot passes through a flux containing a mixture of zinc and ammonium chlorides. This floats on top of the molten tin. Its function is to dry the plate out of contact with the air and to remove imperceptible films of oxide or rust, this being necessary if a tight coating of tin is to be obtained. The plate passes through the flux, into the molten tin, under the center partition, then upward through a bath of palm oil, which also floats on top of the tin. The object of the palm oil is to cool the plate to a temperature above the fusion point of the tin, so that the rolls of the tinning machine can strip off the excess tin and distribute the remainder as evenly as possible on the surface of the plate. The coat of oil remaining on the plate protects the hot tin from the air while cooling, thus giving the finished plate a more lustrous surface. A mixture of wheat and rye middlings has been found to be the most satisfactory agent for removing the palm oil and polishing the plate. Also, the wheat and rye middlings leave a valuable by-product. Containing many food elements and fortified with the fat-giving palm oil with which they are saturated, these substances make excellent stock food. At the delivery side of the tinning stacks, the finished plates are piled automatically, ready for assorting. The average coating of tin applied is about one and one-half per cent of the weight of the finished plate.

Inspecting and assorting is done by women. They have been found more adept than men at this work. Stacks of tin plate are trucked from the tin house to the assorting room, where they are placed on well-illuminated tables. Each plate is examined minutely on both sides for defects. They are classified into four grades primes, seconds, menders, and waste plate. Primes are commercially perfect. Seconds, also are sold to the trade, but will yield more or less waste or scrap. Menders are plates with coating defects which can be corrected by passing them again through the tinning process. Waste plate contains defects which cannot be corrected and is used as scrap.

Elaborate physical and chemical tests have been made throughout this entire manufacturing process.

After inspection and assorting, primes and seconds are counted into packs of 112 plates each, check-weighed and boxed or crated. Destination of a shipment largely determines the size and style of box or crate. If shipped by truck to a nearby factory, a simple package of perhaps a ton in weight on wooden skids, well covered with heavy pasteboard and held together with steel straps, will suffice. Export shipments usually are sealed hermetically in small tin boxes, which are then enclosed in wooden cases.



Top—The strip at the end of the pickling lines after cleaning. Acid removes the dirt and scale and water has rinsed the acid away. Center—The finishing side of one of four tempering mills which restores the gloss after annealing and reduces the metal not over four per cent. The strip which started as a slab about seven feet in length now measures 5,830 feet. Bottom—One of the eight shearing units which trim the sides, cut the steel into any desired length and automatically sorts and stacks the sheets. The assorter gages the thickness of the sheet with a flying micrometer and separates the under-gage, over-gage and proper gage sheets into their respective piles

The Transportation of Petroleum

BY

R. C. Tuttle

Vice President, Atlantic Refining Co.

IN maintaining an uninterrupted flow of its products from the well to the refinery to the consumer the petroleum industry calls into play virtually every medium of transportation except the airplane. The cost of maintaining this steady flow is naturally an important factor in determining what the consumer has to pay for gasoline, fuel oils, lubricating oils, and other petroleum products. That the U. S. motorist pays close to the world's lowest price for gasoline is in no small degree due to the success of the petroleum industry in adapting the various forms of land and sea transportation to provide the most economical and efficient carriers of the products from its wells.

Development of the Tanker Fleet

The modern oil tanker is probably the most efficient water carrier of bulk cargo ever conceived. The world's oil fleet aggregates approximately 10,000,000 gross tons. Tankers constitute about one-third of American merchant marine tonnage. Petroleum and its products provide nearly one-third of all water-borne tonnage in American world trade. Day and night American oil tank ships transport petroleum products on all the seas touching our coasts and on all our navigable streams. During a single month tankers have unloaded as much as 45,000,000 barrels of crude oil, gasoline and other petroleum products at United States ports.

From the docks of what is now The Atlantic Refining Company the first ship to carry a cargo of oil on the high seas sailed for England from Philadelphia in 1861. The ship was the 224-ton brig the "Elizabeth Watts" and she carried her cargo in barrels. It was not until 1869 that the first oil ship fitted with iron tanks appeared. The name of this pioneer tanker was the "Charles," a sailing vessel of 774 tons, with 59 tanks. Prior to this the oil had been shipped in barrels or the entire hold of the vessels in the trade had been used as a single tank. The first steam tanker appeared in 1872 and by 1885 more than 1000 ships with a capacity of from 2500 to 14,000 barrels of oil were transporting American petroleum products to ports all over the world.

The modern oil tanker descends in a straight line from these early oil carriers, but the remarkable development that has taken place in the construction of this type of vessel is graphically illustrated by an Atlantic Refining Company tanker which went into service in February of this year. Named the "J. W. Van Dyke" after Atlantic's Chairman of the Board, the new 18,500-ton tanker is the world's largest welded ship and has a capacity of 156,000 barrels, or 6,552,000 gallons of gasoline—enough gasoline to supply the average requirements of nearly 10,000 motorists for a full year. On one trip the vessel will be able to carry more oil than was produced in any one day from 1878 to 1909. Turbo-electric engines developing 5000 horsepower give the ship a speed of 13.25 knots enabling her to make the trip between Philadelphia and Texas Gulf ports in six days. Three 300-horse power discharge pumps, driven by 2300-volt explosion proof motors, make possible the discharge of cargo at the rate of 630,000 gallons an hour.

Operation of the Fleet

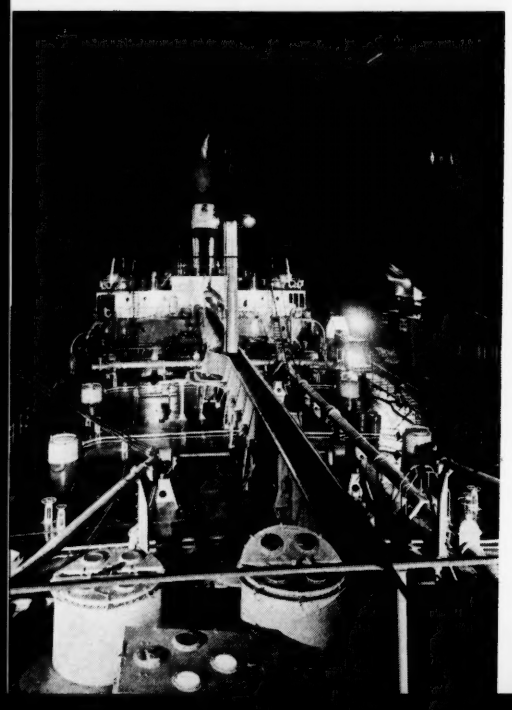
The time required for the actual discharge or loading of cargo is, of course, and important factor in determining the speed of the "turn-around." The usual discharge rate is about 5000 barrels, or 210,000 gallons, an hour, but the "J. W. Van Dyke" will be able to discharge her entire 6,552,000 gallons in less than 11 hours—about one-third of the time normally required. Shore pumping equipment at Atlantic's new refinery at Atreco, Texas, will enable her to take on her full cargo in approximately 8 hours—or at the rate of 840,000 gallons an hour.

Radio telephone communication between refineries located at tidewater and their tugs that operate in the harbor is a recent development that speeds the handling of tanker cargoes. By means of this ship-to-shore phone communication many hours are saved when a tug that has left the docks is needed in a hurry at some point in the harbor, and it is frequently possible to keep the tugs working efficiently in thick weather that would otherwise slow them down or put a complete stop to their activity.

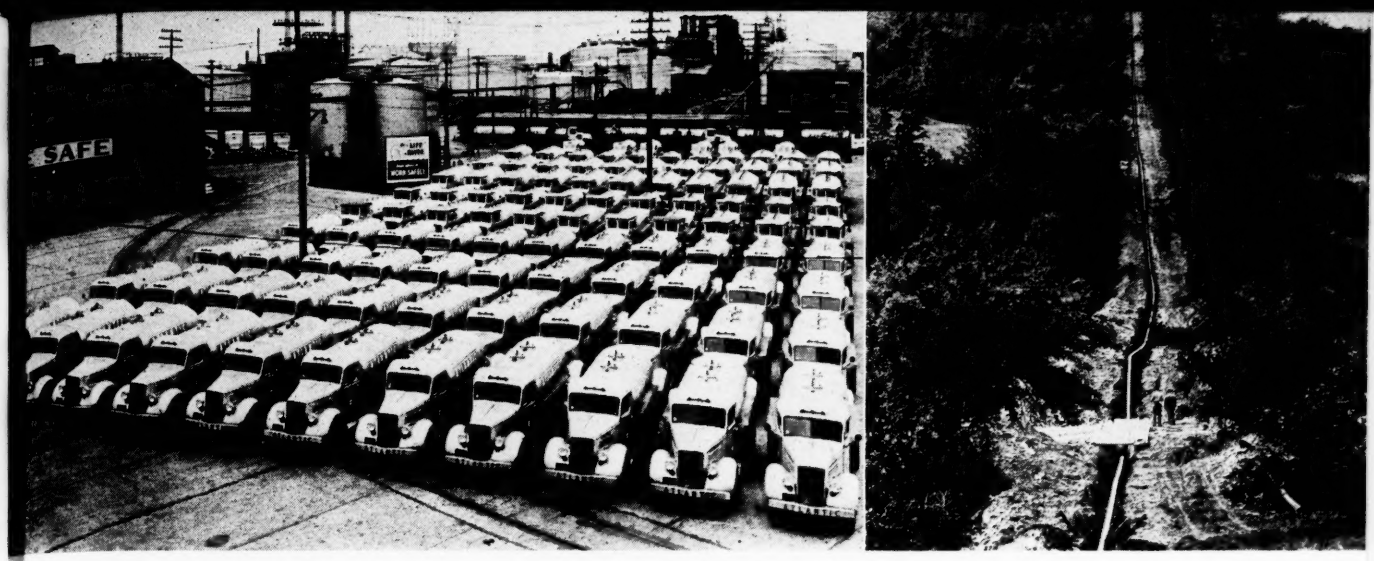
At some loading points tankers take on their cargoes without docking or even entering the harbor. Pipe lines and submarine hoses may run a full mile out into the ocean. The tanker is brought into position, anchored, and made fast to buoys which in turn are anchored to the ocean bed. The submarine hose is hauled aboard and attached to one of the tanker's intake pipes. At the proper time orders are given by submarine telephone to begin pumping in the oil. When the loading is completed the hose is cast off, made fast to a buoy to mark its location, and the tanker sets out to sea.

Pipe Line Transportation

Just as the modern oil tanker is a skillful adaptation of the cargo ship to the transportation of a particular type of cargo, so the oil pipe line is an equally skillful and efficient adaptation of a medium used for centuries for the transportation of water. A map of the oil pipe lines in the United States would show an enormous network of steel, forming one of the most important but least known of our present-day transportation system. It requires 55,000 miles of pipe line to gather the day's supply from 345,000 active oil wells in 20 states and transport it to the main trunk line stations. From the gathering stations the oil flows steadily, day and night, through 60,000 miles of pipe line to 437 operating refineries in 28 states and to a number of marine terminals at coastal points. Approximately 5,000 miles of pipe line carry motor fuels from 20 refineries to points throughout their marketing areas.



Night scene aboard an oil tanker loading a cargo of petroleum products



Left—Fleet of modern tank trucks ready to start on their daily round of deliveries. Right—Laying a pipeline over the side of a mountain on a recently built extension to carry products of the Atlantic Refining Company.

The first oil pipe line in the United States was built in western Pennsylvania in 1865, six years after Colonel Edwin L. Drake drilled his first well and struck oil near Titusville. The line was laid down by M. E. Van Syckel and his associates. It consisted of a five and one-quarter mile stretch of two-inch pipe running from the Miller farm to Pithole, and had a capacity of 800 barrels a day. In 1874 J. J. Vandergrift and George W. Foreman completed a line from the Pennsylvania oil regions to Pittsburgh, capable of transporting 7500 barrels a day. Four years later work was started on a pipe line that crossed the Allegheny Mountains and carried oil from the western Pennsylvania fields to the Atlantic seaboard.

Within the next few years pipe lines began to multiply with amazing rapidity. As the producing areas of West Virginia and eastern Kentucky were developed, and as new fields were opened in Ohio, Indiana and Illinois, it was logical for the trunk pipe lines to build western extensions and, as new refineries were constructed, to build branch lines to these. When oil became plentiful in the Mid-Continent area, the lines were extended again. Lines were built in Louisiana and Texas to carry the oil to the refineries on the Gulf Coast. Pipe lines spread their network in the Rocky Mountain region and in California.

The Pipe Line Crew

Complete coordination of all the operations involved in the laying of a pipe line makes possible the achievement of remarkable records for speed. On a 225-mile extension built last summer to carry products of The Atlantic Refining Company, as much as 25,000 feet of pipe line was laid in a single day. The entire extension, running from Williamsport, Pennsylvania, to Rochester and Buffalo, New York, was laid in four months.

Pipe lines cross deserts and climb mountains. They burrow under rivers and even run along the bed of the ocean —and such water crossings frequently provide the most exacting tests of ingenuity and skill. When the tide is low, Nueces Bay, on the Texas Gulf Coast, becomes a vast expanse of black muck, but when the tide is high and a strong wind is blowing in from the Gulf of Mexico it becomes sufficiently deep and rough to be extremely hazardous. The normally shallow water, and the fact that at times there is no water at all, merely a sticky mud, requires the use of shallow draught barges and heavy pulling and hoisting equipment. To meet these conditions, engineers in charge of a recent pipe line job devised a piece of equipment called "The Mud Hen," consisting of a barge having a tractor rear and connected with a gasoline engine. Heavy plates were welded paddle fashion to the axle shafts of the tractor and were extended to the outside of the barge hull. In this manner "The Mud Hen" was propelled through the muck and shallow water, drawing the barges containing the men and materials about the Bay.

Protection Against Corrosion

Corrosion is a destructive agent against which a constant battle has to be carried on after a pipe line has been laid. When the steel pipe is buried underground small electric currents are frequently set up on which the metal floats away. The steel pipe is the anode from which the iron ions run off into the soil. One ampere of current can carry off twenty pounds of steel a year.

Impressing a small voltage from some outside source, thus reversing the current, provides one of the many methods of preventing this electrolytic corrosion. The pipe then becomes the receiving end, the cathode. Any source of direct electric current power can be used for this cathodic protection, and one of the most widely used sources is a series of small, low-voltage generators driven by windmills. Another method consists of producing electricity by the corrosion of scrap iron. Hogsheads containing the scrap iron and other materials and chemicals are buried at intervals along the route of the line. Each hogshead holds enough materials and chemicals for continuous operation over a period of a year.

Wrapping the pipe and coating it, usually with some form of tar or asphaltic substance, is also widely used as a precaution against corrosion under certain conditions. In laying a line under the ship channel at Houston, Texas, the pipe was painted with a tar solution heated to 350 degrees Fahrenheit, wrapped in cloth, treated with creosote, tarred again and treated with asphalt. In all, coverings amounted to four coats of tar; two cloth covers and two paper covers.

Operation of the Pipe Lines

In many respects the operation of a pipe line system is similar to the operation of a railroad, with its trunk lines, feeders, terminals, storage yards, switch systems, stations, dispatchers, telephone and teletype systems. Unlike the freight train, however, the pipe line does not have to transport itself as well as its load. The fluid is kept moving through the pipes by pumping stations, usually located about forty miles apart, although in hilly country, or for heavy and viscous oil, they may be placed at more frequent intervals.

Each station is equipped with pumps powerful enough to send the stream on to the next station, and is provided with storage tanks having a capacity ranging from 400,000 gallons to more than 2,000,000 gallons. Frequently three or four different "slugs," or batches, each consisting of from 1,000,000 to 10,000,000 gallons, and each consigned to a different destination, will move through the same pipe line at the same time. Each "slug"

(*Continued on page* 58)

Left—Carpentry class in vocational education repairing an old house. Center—Trade class in printing learning to operate linotype machines. Right—Students in home economics are taught to prepare and serve meals as part of the duties in efficiently running a house

Vocational Training of North Carolina Youth

BY

T. E. Browne

Director, N. C. State Vocational Education

SINCE the school year 1917-18, following the passing of the Smith-Hughes Act by Congress in 1917, the teaching of vocational subjects has been recognized as an integral part of the public school program in North Carolina. The program was begun by taking over the activities of the twenty-one farm life schools, which had been conducting courses in agriculture and home economics since 1912 and 1913, and by organizing evening classes for tradesmen largely in textile communities.

The providing of practical training as a part of the public school offerings has met a hearty response among the people of North Carolina, and there has been a steadily increasing demand for vocational education and an expansion of the program.

The program of vocational education in agriculture has reached more people and shown most significant results, largely because by far the largest allotment of Federal funds to the State is for agriculture and because North Carolina is still predominately a rural state. Starting with 21 schools, enrolling 323 students in 1918-19, the work has grown till in 1937-38 there were 371 schools offering instruction in vocational agriculture to approximately 27,000 students in all-day, part-time and evening classes.

Two of the most significant factors in the program of vocational agriculture are the supervised home practice and the farm shop program. Every boy taking the course in agriculture must carry on a supervised farm program on the home farm.

This supervised farm program is the laboratory practice of his course and provides the opportunity for the student to try out the things he learns in the classroom. The student keeps an accurate record of his farm operations, including rent of land, cost of preparation, cultivation, fertilization and harvesting, and makes a report to his teacher at the end of the crop season. This accounting must show whether or not the enterprise has been profitable, and to what extent.

For the school year 1936-37, the last year for which statistics are available, the project income on supervised farm practice of students was $1,430,733.26 in North Carolina.

Each high school where vocational agriculture is taught must provide and equip a farm shop where the students are taught the use of the ordinary carpenter's tools. In these shops the boys learn to make farm and home appliances, to repair farm machinery, and to do many of the jobs around the farm and the home which would ordinarily go undone. Then, too, many a farm boy who has a practical, mechanical turn takes a real interest in the shop work, and goes on to take tra'n-ing for a skilled trade.

The program in home economics education, even though receiving much less from the Federal appropriation, has made rather phenomenal progress in North Carolina. Starting with the twenty-one farm life schools in 1918-19, there are today 227 high schools giving courses in vocational homemaking to 15,756 girls. The significant fact about the vocational home economics departments is also the supervised home practice. The teachers who, as in agriculture, are employed by funds from Federal, State and local sources, are on the job ten months in the year. They are in the school district one month before the school opens in order that they may visit the homes of the students, and make arrangements with parents for the girl's home practice. The teacher is also in the community one month after the close of school for the purpose of visiting the students, checking up on the supervised home practice and getting a report of results.

The modern home economics course taught in the high schools of today involves everything which should claim the attention of the homemaker, and includes units in foods, health, clothing, child care and training, home management, house furnishing, consumer education, care of sick in the home, family relationships, and the application of the arts and sciences to the home. Each student is required to carry on one or more projects at home where she puts into practice what she learns in the classroom. It is the duty of the teacher to make frequent visits to the girl's home to see that the supervised home practice, or project work is carried on properly.

The emphasis in vocational home economics is upon training for efficient and happy homemaking and family living, rather than confining the instruction to the mechanics of cooking and sewing. The trend today is to provide at the school opportunities for the girl to get experiences which will enable her to maintain the best possible home at the income level of her family. Therefore, instead of the traditional classroom and laboratory in the high school building the cottage plan for providing space for home economics is advocated. In this cottage actual liv-

(Continued on page 60)

Group Hospitalization or State Medicine

BY

E. Morrell

THE inquiry of the United States Attorney General's office into the attitude of the American Medical Association toward group health services, focuses attention on the latter as a sociological movement of the present day. As such, it is a matter of considerable interest to all the people and particularly to industry.

Just what the American Medical Association specifically objects to, it is rather difficult to ascertain. As far as the writer has been able to find out, it can be summarized as: fear of so-called state or socialized medicine, regulation of doctors' fees, and restriction of individual initiative among doctors to develop further the various fields of medical research.

Fear of so-called socialized medicine is a real one. Those who know anything of state medicine as it exists in other countries, will agree that it must be avoided in the United States. At the same time, the constantly increasing and already high costs of medical care are such that unless an alternative is found to our present method of individual procedure, we are bound, eventually, to find ourselves face to face with state medicine. Consequently, attempts to frustrate group hospitalization are, in actuality, one of the surest means to hasten that which is most feared. Experience shows that under state medicine, the patient too often receives inadequate care and many of the doctors working under it are apt to degenerate into little better than quacks; or, if they have a private practice in addition to state work, patients of the latter are neglected in favor of the former. That there are exceptions to the above is admitted, but they are probably in the minority.

The high costs of medical care undoubtedly are due in part to specialization making possible the treatment of certain conditions by new and more scientific methods. This in turn is bound to have an effect upon the fees charged by certain doctors. But it does not explain the all too prevalent commercial attitude of a portion of the medical fraternity who apparently have decided that the Hippocratic oath, or that part of it which says ". . . I will go . . . for the benefit of the sick, keeping myself aloof from every voluntary act of injustice and corruption and lust," is merely a jumble of words to be forgotten as soon as they have been uttered. Finally, it is believed that most medical discoveries of recent years are the outcome of institutional sponsorship and not of individual initiative, while in the last analysis, group hospitalization of today affects the doctor only indirectly.

It may be asked, what is group hospitalization? Very briefly it is this. A non profit mutual association organized as a community service to provide hospital facilities in case of need to members who make small regular contributions. Of course, there are wide variations in the type of service offered and many organizations themselves offer several different classes.

The basic idea is not new. What is new is the attempt to offer coverage to those classes of individuals least capable of meeting the frequently unexpected cost of hospitalization. It gives the working class an opportunity to obtain the necessary service required without accepting charity. It relieves the middle class of unprovided for expense while providing them with the kind of attention they require. It relieves those business concerns which have heretofore provided, at great expense, substitute medical facilities for their employes. It offers coverage to every member of a family. It relieves the hospitals of a considerable amount of charity work thus permitting the money to be expended for other purposes or lightens the load of the taxpayer and private contributor. It makes it easier for patients to meet the doctor's charges. And last but by no means least, it is the most progressive form of preventive medicine because the economic barrier to correcting existing pathological conditions is largely removed.

What kind of service is offered and what is included? The kind of service depends upon two things. (1) The types of service offered by the local group, and (2) the ability to pay. An average would possibly be in the region of 75 cents per adult per month for a semi-private room. In different localities the price would range up and down from this figure. Children under 16 years of age are often included for half this amount while under an increasing number of plans an inclusive figure is made for the entire family. In some instances a small charge is made the first month over and above the usual monthly contribution to take care of initial expenses. In others, the wage earner, or head of the family, pays a slightly higher amount than do other adults of the family.

When it comes to the matter of what is included, the amount of the payment again is the determinant. Regardless as to whether a patient is entitled to a private room or only a bed in a ward, it is usually understood that all normal hospital charges are included. Special nurses, special medicines, etc. other than those of a general character, and doctors' bills, are not as a rule included. However, some hospitals operate on the basis that ward patients receive doctors' attendance free of charge and some plans specifically provide for the inclusion of anaesthetics and X-rays. The length of time in hospital to which a patient is entitled is an important point and varies, as do other details, with the particular organization, but as far as the writer is aware, the range is usually from 20 to 30 days per year. Where longer hospitalization is necessary, credit is given for the time the patient is entitled to. Occasional provision is made for a small annual increase in the number of days if a member does not require hospitalization in any one given year. In the case of hospitalization becoming necessary while away from home, nearly every plan provides for a credit in outside hospitals equal to the amount a member hospital would receive if the patient were at home.

At the present time, group hospitalization organizations are functioning in approximately 45 cities throughout the United States with a total enrollment of 2,000,000 or more members. There may be other groups but this number has been approved by the Committee on Hospital Service of the American Hospital Association. For the benefit and protection of members this Committee has formulated and published a set of standards which must be met before recognition is granted.

The earliest of the accredited groups to be organized was one of the California associations in 1932, but the majority have come into existence during the past two or three years. The larger plans three years old or more have averaged about 72 per cent for hospital charges, 17 per cent for reserves and 11 per cent for administrative purposes.

As far as use of the plan by members is

(*Continued on page 58*)

Southern Construction Stable

SOUTHERN construction remained relatively stable during August. A $74,359,000 total valuation of work as reported in the daily issues of Construction was more than four per cent ahead of the comparable month of 1937 and less than three per cent lower than the preceding month of this year. The decrease from July's figure, which is the peak month for this year, was due to sluggishness in private building and road construction.

Contracts for the first eight months of this year are about seventeen per cent lower than during the similar period of 1937. The $494,702,000 total for this year includes $135,656,000 for roads, $119,127,000 for general building, $137,676,000 for industrial and engineering projects and $102,243,000 for public building. Road construction is now well ahead of the total for last year this time. General, industrial and engineering and public building work are behind. The preponderance of proposed public building, however, will probably raise this latter type considerably.

August's contracts were helped to a high level by an increase in public building in face of drastic decreases in highway and bridge awards to $18,742,000, a figure which while much lower than that for the preceding month is still higher than the total value of highway and bridge projects initiated during August of 1937. Industrial and engineering work in August passed the July figure by a slight margin.

The increase in public building contracts was the most notable, although not unexpected. The August total was $21,851,000. Totals for July of this year and August of 1937 were $11,809,000 and $10,852,000, respectively. School contracts comprise slightly under two-thirds of the current August total, with city, county, State and Federal structures making up the balance. Industrial and engineering contracts totaling $22,416,000 in August are slightly higher than July, but lower than August of 1937.

Several large awards were responsible for keeping the level of August's industrial contracts almost up to the July total, although for the most part the projects were all of a lesser nature, but important in their respective communities as additions to industrial activity. High among the ranking industrial projects was that of the American Viscose Co. for a second unit at its Nitro, W. Va., plant. The extension, which will double the plant's capacity, will require an additional 200 workers. Cost of the work is reputed in the neighborhood of several million dollars. Two tobacco companies also entered the construction field during the month. At Richmond, Va., the American Tobacco Co. made the award for a $250,000 research laboratory. The United States Tobacco Co., at Nashville, Tenn., prepared to raze an existing building and erect a $148,000 power house. Wise Contracting Co., a local concern, received the Richmond award. Plans for the building were prepared by Francisco & Jacobus, engineers of New York.

Another development in the building materials manufacturing industry occurred during the month. The United States Gypsum Co., of Chicago, Ill., was reported to be planning a $1,000,000 plant on the Trout River, at Jacksonville, Fla. National Gypsum Co., of Buffalo, N. Y., the month before had awarded contract for a $1,000,000 wallboard plant at Savannah, Ga., after completing a similar unit at Mobile, Ala. Johns-Manville Corp. is now constructing a $1,000,000 plant at Jarratt, Va.

The Virginia Electric Power Co., Richmond, has plans for a $3,000,000 addition to its Twelfth Street power plant, which about two years ago was enlarged by a similar extension. Eighteen months will be required to increase the plant's present capacity to more than 100,000 kilowatts by installation of a 40,000 kilowatt turbogenerator and a new steam boiler. Stone & Webster Engineering Corp., of Boston, handled the first addition. Sanderson Porter Construction Co., New York, received the award for rebuilding a burned hydroelectric plant at Millville, W. Va., for the Potomac Edison Co., of Hagerstown, Md.

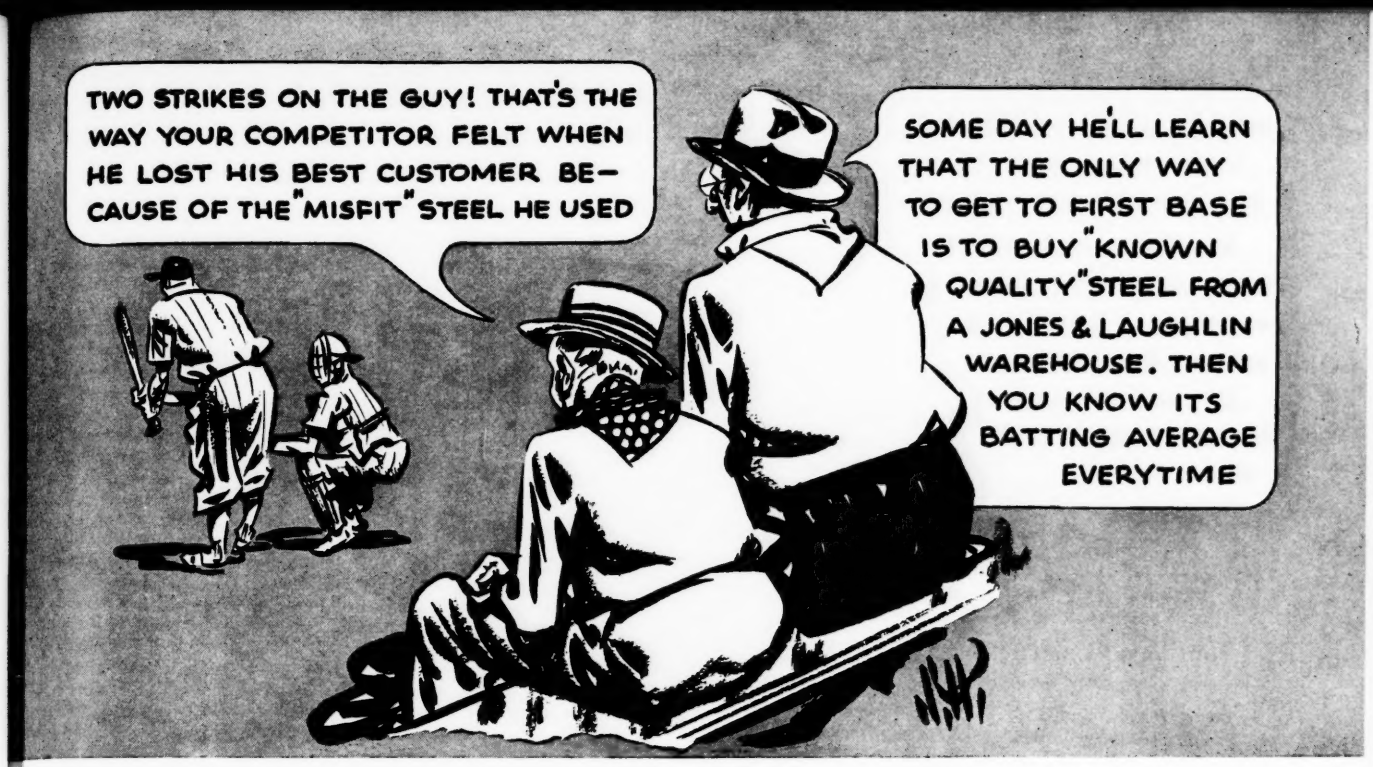
Right-of-way negotiations are understood to be under way for a 48-mile pipeline to be constructed by the United Gas Pipe Line Co., of Houston, Tex. The proposed line is to extend from the Katy gas area in Waller and Harris counties to a point near Clinton station, northeast of Houston. Pipe will be 10, 12, and 16 inches in diameter and the length of the line 48 miles. Calvert Distillers Corp. appropriated $400,000 to complete an improvement program at its Relay, Md., plant.

A $450,000 expenditure is to be made within three months at the Ashland, Ky., works of the American Rolling Mill Co. The improvements will enable the plant to make electrical sheet steel bars and light gauge sheets. A sulphur purification plant for the Freeport Sulphur Co. will cost about $120,000. Foundation piling is being driven for the plant, which is to be located at Lake Grand Ecaille adjacent to the existing plant among the bayous of Plaquemine Parish, Louisiana. Anheuser-

(*Continued on page 40*)

Statistics of the South's Construction

	August, 1938 Contracts Awarded	August, 1937 Contracts Awarded	August, 1938 Contracts to be Awarded	August, 1937 Contracts to be Awarded	Eight Months 1938 Contracts Awarded
GENERAL BUILDING					
Apartments and Hotels	$4,265,000	$5,044,000	$5,138,000	$2,699,000	$29,828,000
Association and Fraternal	175,000	392,000	251,000	267,000	1,669,000
Bank and Office	250,000	1,091,000	8,092,000	715,000	7,901,000
Churches	1,044,000	568,000	985,000	1,085,000	6,307,000
Dwellings	3,015,000	5,711,000	5,433,000	7,942,000	49,070,000
Stores	2,601,000	3,774,000	1,948,000	2,636,000	24,352,000
	$11,350,000	$16,580,000	$21,847,000	$15,344,000	$119,127,000
PUBLIC BUILDINGS					
City, County, Government and State	$13,802,000	$6,149,000	$64,938,000	$21,316,000	$64,222,000
Schools	8,049,000	4,703,000	60,056,000	17,191,000	38,021,000
	$21,851,000	$10,852,000	$124,994,000	$38,507,000	$102,243,000
ROADS, STREETS and BRIDGES	$18,742,000	$17,794,000	$43,300,000	$61,566,000	$135,656,000
INDUSTRIAL AND ENGINEERING					
Drainage	$1,436,000	$840,000	$43,235,000	$22,928,000	$15,147,000
Filling Stations and Garages	395,000	498,000	157,000	635,000	4,003,000
Industrial Plants	18,671,000	21,983,000	48,943,000	33,556,000	103,518,000
Sewers and Waterworks	1,914,000	2,751,000	27,660,000	4,099,000	15,008,000
	$22,416,000	$26,072,000	$119,995,000	$61,218,000	$137,676,000
TOTAL	$74,359,000	$71,298,000	$310,136,000	$176,635,000	$494,702,000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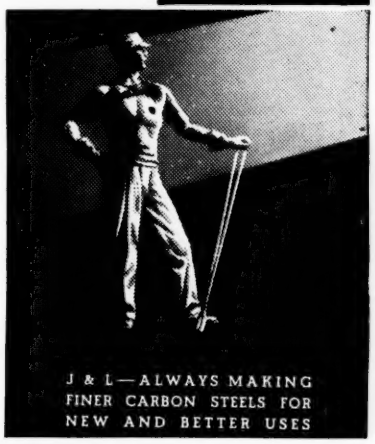

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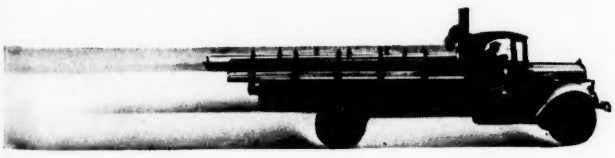

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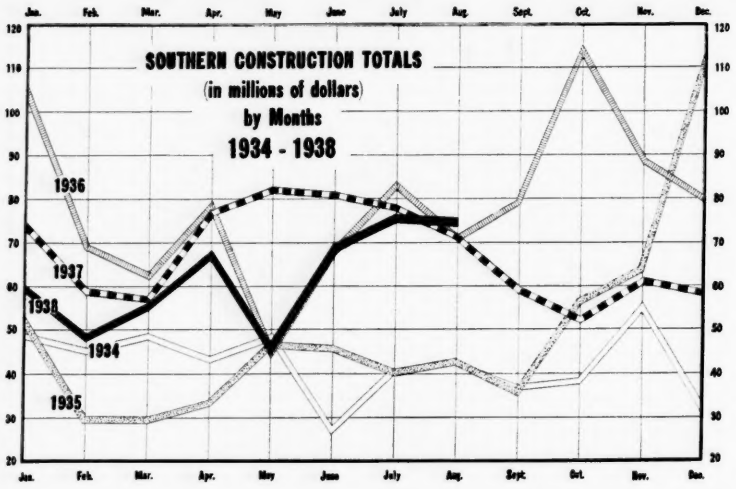


Southern Construction Stable

(*Continued from page* 38)

Busch, Inc., St. Louis, Mo., took out a permit for a $190,000 stockhouse. Chipman Chemical Co., Inc., proposes a $200,000 sulphur grinding plant at Houston, Tex.

Morris-McKoy, of Greenville, S. C., received the contract for a $175,000 plant at Greenwood, S. C., to be occupied by J. B. Carr Biscuit Co., of Wilkes Barre, Pa. Champion Paper & Pulp Co., of Hamilton, Ohio, has a kaolin plant project at Sandersville, Ga. Shell Petroleum Corporation's plans at Healdton, Okla., contemplate expenditure of $100,000 for absorption equipment. Welrods Corp., Sparrows Point, Md., let the contract to the Consolidated Engineering Corp., Baltimore, for warehouse facilities. American Zirconium Corp., will erect a weak acid recovery plant in the St. Helena section of Baltimore. Bids were received for the Baltimore Coca Cola plant; contract was let at Waco, Tex., for a Coca Cola bottling plant. The award went to C. C. Ramsey.

Private building was twenty-seven per cent lower in August, as compared with July. The total for private building was $11,350,000, made up of $4,265,000 for apartments and hotels; $175,000 for association and fraternal buildings; $250,000 for bank and office work; $1,044,000 for church construction; $3,015,000 for dwellings, and $2,601,000 for store construction. Store contracts were the only type showing an increase. Dwelling contracts were practically one-half of what they were the preceding month.

Apartments and hotels were marked by a number of group apartment projects. Among the largest of these was a $2,500,000 development at St. Louis. Plans are under way by Preston J. Bradshaw. A $300,000 hotel to contain 100 rooms is proposed at Montgomery, W. Va., by the Coal Valley Hotel Co. L. T. Bengston, of Charleston, is the architect. A $375,000 apartment building projected at Washington, D. C., by John J. McInerney has been designed by Dillon and Abel.

W. P. Robertson, head of the Robertson Aircraft Corp., St. Louis, is interested in a $200,000 apartment for Ferguson, Mo. The Meadowbrook apartment project at Washington will cost $325,000. It has been designed by Robert O. Scholz. Constantine & Bradbury, of Atlanta, are the architects for a $450,000 apartment development of 11 buildings proposed at Columbus, Ga. A $600,000 apartment at Memphis, Tenn., is in its preliminary stages. J. Ripley Greer is representing the owners. R. L. Jackson's contract for apartment construction at Birmingham, Ala., covers a building with 200 apartments. Hub Rieson & Sons, Miami, Fla., will build four apartment units at a cost of $230,000.

Store construction, the one type of work which showed an August increase over July, presented a number of smaller projects, with a few of the more important ones such as the $100,000 Weingarten food market for which contract was awarded Bace Construction Co. of Houston, Tex. A similarly sized store building for the Oak Cliff Development Co. of the same city was designed by Phil G. Crown.

Representative Projects in the South Last Month

Bids Opened or Awarded

Ala., Tuscaloosa—University of Alabama
Library building; Batson-Cook, West Point, Ga., Contr. 314,000

Ark., Little Rock—St. Vincent's Infirmary
Hospital remodeling; Manhattan Construction Co., Muskogee, Okla. (low bidder) 141,000

D. C., Washington—District Commissioners
Junior high school; Bahen & Wright, Inc., Contr. 684,000

Fla., Tallahassee—Florida Board of Control, James E. Cotton, Dir.
Women's dormitory, (State College for Women); Beers Construction Co., Atlanta, Ga., Contr. 369,000

Ga., Savannah—Dixie Asphalt Products Co.
Plant; The Artley Co., Contr. 350,000

Ky., Fort Knox—Constructing Quartermaster
Barracks; Great Lakes Construction Co., Chicago, Ill., Contr. 1,163,000

La., Krotz Springs—Missouri Pacific Lines
Railway bridge; Kansas City Bridge Co., Kansas City, Mo., (low bidders) 723,000

Md., Annapolis—Bureau of Yards & Docks
Apartment houses (Naval Academy); Consolidated Engineering Co., Baltimore, Md., Contr. 1,100,000

Miss., Jackson—W. G. Avery Body Co.
Plant; Thomas B. Scott, Jackson, Contr. 100,000

Mo., Wappapello—U. S. Engineer, Memphis, Tenn.
Flood Control (Wappapello dam); Hallet Construction Co., Crosby, Minn., Contr. 1,883,000

N. C., Raleigh—North Carolina State College
Dormitories; Ervin-West Construction Co., Statesville, Contr. 190,000

Oklahoma—U. S. Engineer, Little Rock, Ark.
Great Salt Dam project; Odell and Riney Construction Co., Inc., Kirkwood, Mo., Contr. 414,000

S. C., Greenwood—Morris-McKoy, Greenville, S. C., Contr.
Building for J. B. Carr Biscuit Co., Wilkes-Barre, Pa. 175,000

Tenn., Nashville—State of Tennessee
State office building; Nile E. Yearwood, Nashville, Contr. 840,000

Tex., Fort Sam Houston—Constructing Quartermaster
Barracks; A. J. Rife Construction Co., Dallas, Tex. Contr. 752,000

Va., Norfolk—Bureau of Yards & Docks
Pier No. 5 at Norfolk Navy Yard; McLean Contracting Co., Baltimore, Md., Contr. 1,427,000

Virginia—Bureau of Public Roads
Blue Ridge Parkway (Carroll County), McKenzie Co., Dearborn, Mich. (low bidder) 356,000

Among Those Proposed

Ala., Birmingham—City
Street improvements 1,523,000

Ark., State Sanatorium—State Sanatorium and Children's Home
Building, improvements; Haralson & Mott, Fort Smith, and Erhart & Eichenbaum, Little Rock, Archts. 2,108,000

D. C., Washington—Weaver Bros., Inc.
Office building 7,500,000

Ga., Atlanta—State of Georgia
Office building, laboratory; Constantine & Bradbury, Atlanta, Archts. 569,000

Ky., Ashland—American Rolling Mill Co., Inc.
Plant improvements 450,000

La., Benton—Bossier Parish Levee Board
Dam and Spillway at Durden's Ferry; Harry Jacobs, New Orleans, and S. E. Huey, Monroe, Engrs. 1,800,000

Md., Cumberland—Allegany County Board of Education
Schools, additions, alterations 1,092,000

Mo., St. Louis—City
Buildings and additions, City Hospital 2,570,000

N. C., Chapel Hill—University of North Carolina
Dormitories 520,901

Okla., Muskogee—Board of Education
Schools 500,000

Tenn., Chattanooga—Board of Education
Schools 783,000

Tex., Kountze—Hardin County
Road improvements; A. McCormick, Engr. 1,594,000

Va., Richmond—Virginia Electric & Power Co.
Power plant addition 3,000,000

W. Va., Charleston—Kanawha County Board of Education, Virgil L. Flynn, Supt.
Schools 3,460,000

W. Va., Morgantown—Monongalia County
School bonds 600,000

W. Va., Morgantown—Monongalia County
Hospital 1,380,000

LONG DISTANCE RINGS MAKE SMOKE RINGS FOR CIGAR CO.

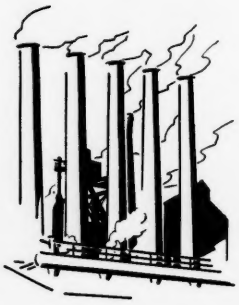
● TELEPHONE rings mean smoke rings for a large Florida cigar company. Its president has built up the business and keeps it running smoothly by day-in, day-out use of Long Distance telephone service.

He says, "We have 34 branches, from Texas to Virginia, with which I keep in constant touch by telephone. If weekly sales reports don't seem satisfactory, I telephone at once. If I want to swing a special deal, I find I can handle it a lot *better* over the telephone.

"Besides the many calls I make, a lot come in to me. When a manufacturer closes a discussion by saying he'll advise me later, I answer, 'I want to know *now*, so think it over and give me a ring!'

"Long Distance keeps me on the firing line every day in widely scattered places. And I'm convinced I've made *ten* dollars by telephone, where I'd have made *one* by other methods."

Iron, Steel and Metal Market



AT the close of August the operating rate of steel producers was at 44 per cent of capacity, compared with 39.8 per cent one month ago, with the belief generally held that the tendency will be upward. Building prospects are improving moderately, and automobile manufacturers, preparing for next year's models, are calling men back to work for increased production, the effect of which will be to create further demands for steel products. During the month production figures rose above 40 per cent for the first time in nine months, and was due probably to anticipation of increased fall business.

Re-stocking of semi-finished steel entered into the picture, and at the same time prices were firmer after some shading previously. Reports indicate that no considerable tonnage was ordered at reduced rates.

Production at 40 per cent of capacity is a little less than half of what it was in 1937, but nearly twice as much as it was in 1934.

Among orders booked were 6,000 tons of shapes by the American Bridge Company for a bridge in California, and 4,500 tons of shapes for a bridge at Washington, D. C., booked by Bethlehem Steel Co. The New York City subway will take more than 6,000 tons and five other contracts running from 1,000 to 1,800 tons were also placed. An order for 15,000 tons of steel pipe was placed between the National Tube Company and Republic Steel Corporation for the Continental Oil Co. Structural orders covered 4300 tons for airplane hangars in the state of Washington, and 1,400 tons for an addition to a state office building at Madison, Wis. A $175,000 order totaling close to 5,000 tons of water pipe has been placed with the United States Pipe & Foundry Company's Bessemer plant by the City of Chicago.

Scrap steel stays around $15 a ton for No. 1 at Buffalo.

The Tennessee Coal, Iron & Railroad Co. in Birmingham announced the resumption of operations at four ore mines where production has been suspended since June 25 and one limestone mine, idle since June 21. An increase in the company's blast furnace operations were given as the reason of resuming work in advance of a date previously scheduled.

Such confusion as arose at the time of changing basing points from Pittsburgh plus is gradually clearing. Pittsburgh steel manufacturers, viewing the situation more or less anxiously at the time the announcement of the change was made, have taken an appraisal of its advantages and express the belief it is still the lowest cost producing center with the exception of Birmingham. It is stated in a dispatch to the *Wall Street Journal* that "the advantage of that Southern point may be more than offset by freight rates between Birmingham and northern consuming districts."

The continuance of that advantage will depend upon the decision reached by the Interstate Commerce Commission respecting the South's request for freight rates on a parity with those of other sections of the country. The mater is still in abeyance, another hearing having been scheduled for October.

In the same dispatch Jones & Laughlin is reported as being chiefly concerned by reason of the competition the South will offer, but it is doubtful if this is the case in view of their exceptional facilities for reaching Southern points by water and their distribution facilities at Southern centers.

Expansion programs in plant facilities by the Weirton Steel Co., which is to spend $5,000,000 in increasing its plant and equipment, and the Youngstown Sheet & Tube Co. expected to spend $17,500,000 in plant improvements, do not indicate any special fear of competition. The Youngstown Co., it is said, plans to construct an additional open hearth furnace and improve its present furnace at East Chicago, Ind., thereby increasing its annual steel ingot capacity from 600,000 to about 840,000 gross tons. The blooming mill is to be rebuilt, and a new 48-inch continuous hot roll sheet and strip mill is to be constructed. A continuous cold rolled tin mill also will be built, while some of the present facilities will be relocated and others for the production of hot rolled tin plate may be abandoned. Improvements contemplated extend to various changes in wire and tube mills at Campbell, Struthers and Youngstown, Ohio.

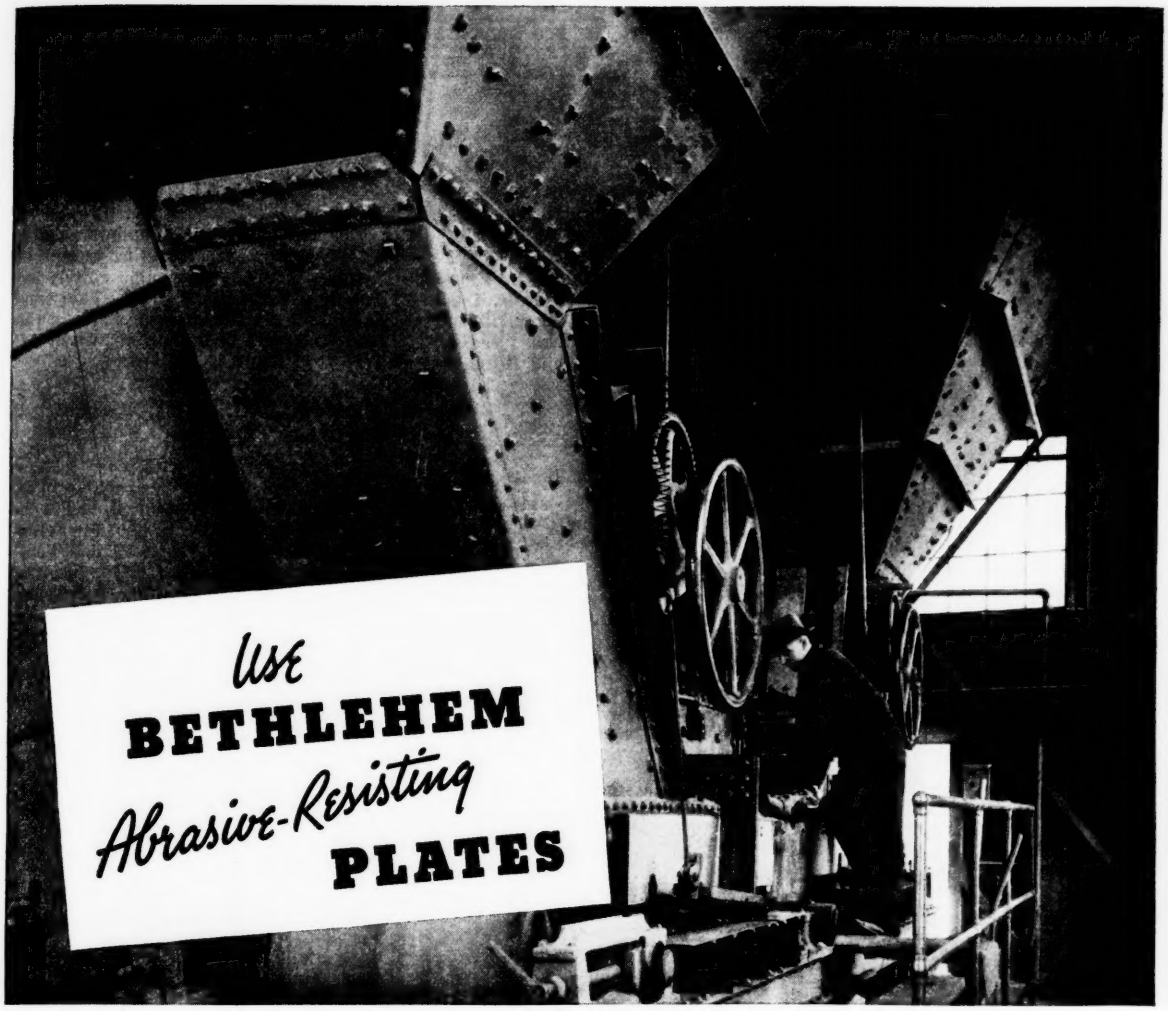
The question of wages is still being discussed but appears much less important than a month or six weeks ago when operations were at a much lower level. A mid-west steel manufacturer was reported to have made a reduction of 25 per cent, having reached an agreement, the report said, with the Amalgamated Association of Iron, Steel & Tin Workers. So far, while speculation has been active, no definite move has been undertaken by the larger companies and with operations virtually double what they were earlier in the summer, it is now admitted that any action toward lowering wage rates would meet with considerably more opposition.

The American Iron & Steel Institute and American Institute of Mining and Metallurgical Engineers have announced a joint meeting with two British institutes, the Iron and Steel Institute and the Institute of Metals, to be held in the United States in October. The meeting will be followed by inspection visits to American steel plants by visiting Britishers.

The Republic Steel Corporation officials are quoted as being optimistic at prospects of their Southern operations. The new bolt and nut plant is expected to go into operation within a few weeks. According to latest reports from Birmingham, Sloss-Sheffield Steel & Iron Co. expect to blow in its second stack on Thursday, September 1st, which will then give the district 13 active blast furnaces. Birmingham operations are now estimated at 53 per cent of capacity and St. Louis at 33 per cent.

Indicating the increased demand for steel generally, some of the mills in the Pittsburgh area will operate on Labor Day, an unusual occurence for that holiday in the steel industry. With the expansion of PWA construction to the point where $1,305,892,000 is the value of approved projects, and increasing demand from a number of sources, operations should continue to rise during the fall.

According to estimates by the American Iron and Steel Institute, the tonnage of steel in use in the United States during 1937 reached a new peak of 1,050,000,000 tons or 25 per cent more steel than was in use in 1929. The 1937 figure represents an average of 18,100 pounds for every person in the country or 300 pounds more per capita than in 1936. The steel industry spent more than $260,000,000 on the upkeep of physical equipment of plants in 1937, an increase of nearly 15 per cent over 1936.



- for longer life in abrasive service

MANY operators of equipment handling highly abrasive materials report that Bethlehem Abrasive-Resisting Plates have from two to ten times the service life of medium carbon steel. Some report increased life over alloy steel plates selling at from four to eight times as much. All agree that Bethlehem Abrasive-Resisting Plates keep replacements at a minimum and materially reduce maintenance costs all along the line.

Bethlehem pioneered in manufacturing this moderately priced abrasive-resisting steel. It is made in two grades: No. 235 and No. 300. In each case the Brinell hardness corresponds approximately to the grade number, with ductility decreasing somewhat as hardness increases.

Data on forming and fabricating and reasonable expectation of service life are freely available upon request.

Some other Bethlehem Products of particular interest to Southern Industry: **Wire Rope**—*made with a "know-how" that means maximum service.* **Steel Sheets**—*Black and galvanized, flat and formed.* **Flanged and Dished Heads. Tool Steels**—*A complete range, covering every requirement.* **Open-Web Steel Joists**—*for fire-resistive, shrinkage-free floors.*

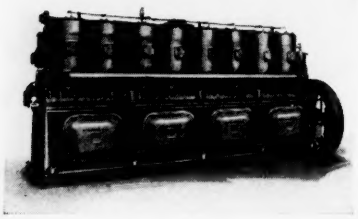
BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

New Ways of Doing Things

LPE Vertical Gas Engine

As the latest addition to its extensive line of gas engines, Worthington Pump and Machinery Corporation of Harrison, N. J., announces type LPE, a new engine of vertical four-cylinder design, a power unit arrangement of the LCE gas engine compressor unit. With the exception that frame extensions and running gear for the compressor cylinders have been omitted, the units are similar and all component parts are interchangeable between them. The LPE engine is of the multi-cylinder, trunk-piston type with cylinders of the L-head design arranged in line. The unit is totally enclosed and has full circulating pressure lubrication throughout. A single magneto may be used for all cylinders. Engines are available in four, six and eight cylinder arrangements, rated at 180, 270 and 360 b.hp. at 400 r.p.m.



LPE Engine of Trunk-Piston Type With L-Head Cylinders Arranged in Line

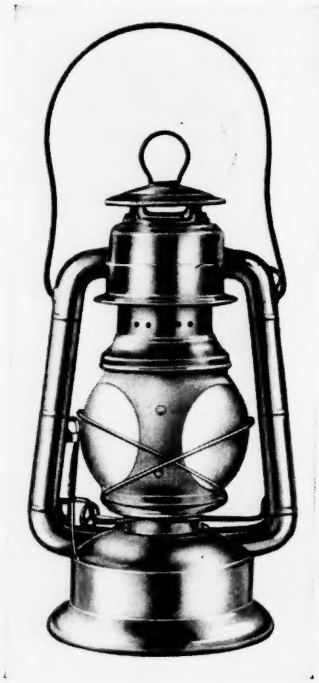
Large Diesel-Powered Truck

Built by the Trojan Truck Manufacturing Company of Los Angeles, Cal., and powered by a 180-horsepower "Caterpillar" Diesel engine made by Caterpillar Tractor Company of Peoria, Ill., the world's largest truck, a 43-yard unit, on a 4-mile haul will handle an average of 85 cubic yards of material an hour on approximately 3½ gallons of fuel. An especially designed tail gate makes it possible to load the unit to its maximum capacity regardless of the type of material being handled. It unloads in 45 seconds by means of a sliding bulkhead in the body that pushes the load out and spreads it simultaneously.

The engine is 8-cylinder, V-type, with bore of 5¾ inches and stroke of 8 inches. At 1100 r.p.m. it develops 180 maximum horsepower. Maximum torque is 1025 ft. pounds at 650 r.p.m. Transmission is a unit power type having three speeds forward and one speed reverse, designed to take the torque and power output of the engine. An especially constructed auxiliary transmission has an overdrive, underdrive and direct drive. The truck is 12-wheel drive with two sets of triple tired wheels in the rear. There are 14 demountable type disc wheels, 24 by 12 inches, having bolt circle diameters of 14½ inches. Tires are 13.50 by 24 inches, 20 ply excavator type tread. The overdrive ratio provides an increase in speed of 40 per cent over that of the direct drive, giving a maximum speed of 25 miles per hour empty, and 15 miles per hour loaded. The underdrive ratio provides 2-1 reduction, allowing ample pulling power on average grades.

New Type Lantern Globe

Differing from earlier styles of lantern globes, a new type lantern globe known as the "LITE-GARD," has been introduced by Detroit Metal Products, Inc., Detroit, Mich. Instead of being entirely of glass, the new globe consists of a steel housing with three glass bulls-eyes equally spaced around its circumference, so as to give perfect visibility regardless of the position of the lantern. A major advantage claimed for this type of lantern is that the combination of steel housing with especially designed bulls-eye lenses makes it practically indestructible as compared with the all-glass type.



"Lite-Gard" Lantern

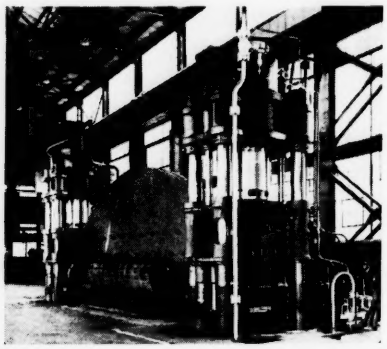
For Handling Wet Pulp

To meet special conditions in pulp mills where heavy bales of wet pulp are handled and stacked, the Towmotor Company of Cleveland, Ohio, has introduced a new TOWMOTOR fork truck of heavy design with a special carriage and quadruple fork arrangement. It also is designed with a detachable and interchangeable scoop, while incorporating such other features as straight gasoline power, hydraulic lift and tilt, high speed forward and reverse and driving wheels under the load—the same as on the standard model TOWMOTOR lift trucks.

Largest Press to Bend Boiler Plate

With a clearance between posts of 40 feet, 6 inches, and capable of cold bending boiler plate of more than 6 inches in thickness, a new press has been installed in the shops of the Hedges-Walsh-Weidner Division of Combustion Engineering Company, Inc., at Chattanooga, Tenn., which is said to be the largest and most powerful of its kind. It consist of two 3000-ton four post hydraulic presses connected by two built-up beams, the upper beam being 14 feet in depth at the center and having a travel of 5 feet. Only the top of the lower beam shows in the accompanying illustration. Total weight of the beams is more than 1,000,000 pounds.

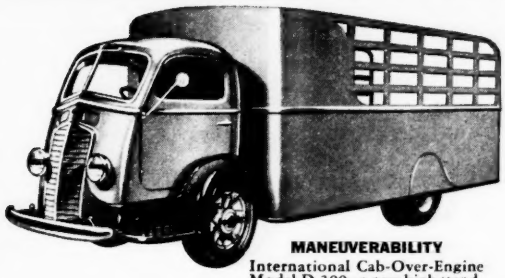
Two main rams are each 50 inches diameter and are operated with water pressure of 1500 or 3000 pounds per square inch, according to whether the intensifier is connected to give the maximum power. On each side there are four push-back rams arranged for high-speed work and under the bottom die there are four manipulating rams for handling the work. From the floor to the top of the cylinders the distance is 27 feet and below the floor the equipment extends 22 feet. Ease of control is an important feature of the machine. Only the working parts are above ground, the overflow and pneumatic filling tanks, intensifier, etc., being below ground. Housed in a new building, 80 by 323 feet, the press is served by a 30-ton special double trolley crane and plate heating furnace capable of taking plates 14 feet wide and 45 feet long.



Large and Powerful Press in Hedges-Walsh-Weidner Shop at Chattanooga, Tenn.

Whatever You Haul

SMART APPEARANCE
International light-delivery units in ½-ton to 1-ton capacities, in three wheelbase lengths.



MANEUVERABILITY
International Cab-Over-Engine Model D-300—a new high standard for close work in crowded traffic.

LET INTERNATIONALS HAUL IT

You get the real measure of International Trucks only when they go to work for you. And then you get a better demonstration of stamina and economy—*more performance per dollar*—than you have ever known before.

International builds every type of truck to meet every trucking requirement, from ½-ton delivery to powerful six-wheelers. In all, there are 30 models in 99 wheelbase lengths. And every one of them is *all-truck* in every inch and ounce of construction and design.

Every International is engineered for outstanding performance and styled for brilliant appearance. The illustrations on this page show the quality of International design. For performance, let the trucks speak for themselves, for *your* business on *your* job.

There are 242 Company-owned branches and thousands of dealers *at your service,* ready to give you a demonstration at your convenience.

INTERNATIONAL HARVESTER COMPANY
(INCORPORATED)
180 North Michigan Avenue Chicago, Illinois

CROSS TOWN OR CROSS COUNTRY
An International 3 to 4-ton Truck-Tractor. International Harvester sells *twice as many* heavy-duty trucks as any other manufacturer.

LEADER IN 1½-TON FIELD
International 1½-ton Model D-30 with special panel-stake body. Several other models for the medium-duty field.

STAMINA IN STEEL
There are many International Six-Wheel Models, Dual-Drive and Trailing-Axle. Gross vehicle weights 18,000 to 62,000 pounds.

INTERNATIONAL

INTERNATIONAL TRUCKS

Synonyms:

SUMMER . .
OUTBOARDS . .
ALUMINUM

ALCOA

ALUMINUM

★

EVERY VACATIONER KNOWS that outboards *make* the summer. And Aluminum *makes* the outboards!

The modern outboard motor is literally a sermon on Aluminum.

A sermon on lightness: Their convenient portability (even of the big ones) comes from the lightness of Aluminum.

A sermon on resistance to corrosion: Mark well how they demonstrate the ability of Aluminum to defy the weather and the waters.

A sermon on heat conductivity: The pistons, cylinders and heads are made of Aluminum. Its better heat conductivity makes the motors more efficient, just as it does in automobile engines. Lightness in the pistons is important, too.

A sermon on strength: In a multitude of parts, big and little, Aluminum has to stand great mechanical stresses, as well as the gaff of the not-too-careful handling which these motors get. Alloys of Alcoa Aluminum are as strong as structural steel, though they weigh but one-third as much.

But still more: Outboards exemplify the practicality, the versatility of Alcoa Aluminum in meeting every sort of fabrication problem.

The point is: Alcoa Aluminum has the qualities the outboard needs to make it the convenient, efficient motor we have all come to depend upon. And the manufacturers can and do use every standard fabrication process to make economical use of the advantages of Aluminum.

IT'S A LIFTABLE IDEA

This story should be as full of ideas for you as the outboard is full of Aluminum.

They bear repeating: Aluminum is light; it resists corrosion; it is a superior conductor of heat and electricity; it has been given the strength you need; and it comes in every needed form for any type of fabrication.

Why not turn these ideas inward on yourself and your business. Ten-to-one you have a spot where Alcoa Aluminum would make your product better. If you have a hunch, let us pit one of our engineers against the problem. Very much without obligation, of course. Aluminum Company of America, 2109 Gulf Building, Pittsburgh, Penna.

How the outboard motor uses Aluminum throughout:

● These parts are all Aluminum castings. They are variously made by the sand-, die-, or permanent-mold process, whichever is best for each individual part. Strong Alloys of Alcoa Aluminum are available for each method.

■ Forgings of Alcoa Aluminum are used for these parts. They have the superior physical properties inherent in this method of fabrication.

▲ Alcoa Aluminum Free-Cutting Screw Machine Rod is used for these parts. It machines beautifully, at high speed, with no tool-fouling.

◆ Tubing, of the proper Alloy of Alcoa Aluminum, used here. It comes in a wide variety of size and shape, and in strength to suit the need.

A look into the inside of the motor would disclose the many other uses of Aluminum: pistons, cylinders, and heads; connecting rods; parts for mixing valves and pumps. Aluminum *makes* the outboard.

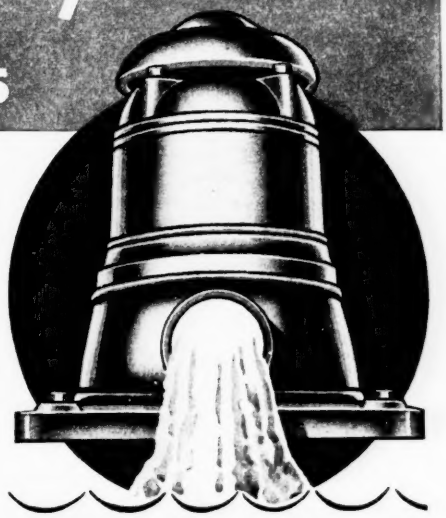
Another Big Paper Mill

SELECTS LAYNE WELLS AND TURBINE PUMPS

WITH a capacity of 18,000,000 gallons daily, three Layne designed, drilled, and turbine pump equipped wells now serve the Brunswick Pulp and Paper Company's newly erected Brunswick, Georgia, plant. These Layne wells were successfully passed through, and cemented against, bad water formations,—a task that required much skill and care. Special equipment was necessary to core through hard limestone formations for the setting of full size, 3/8 inch thick by 18 inch diameter, welded continuous steel casings. The casings were then cemented at the bottom to the Eocene formation.

So again Layne does an outstanding job on a difficult undertaking.

Industries or municipalities contemplating the installation of a new water supply system, or seeking a reduction in water costs, may obtain valuable information by addressing Layne & Bowler, Inc. Here they will be guided by the World's most respected Deep Well water production experience. And, of course, Layne Pumps are equally well known for their records of high efficiency, long life, and low cost. For literature or consultation, without obligation, address LAYNE & BOWLER, INC., DEPT. XI, Memphis, Tenn.



AFFILIATED COMPANIES

LAYNE-ARKANSAS CO. . STUTTGART, ARK.
LAYNE-ATLANTIC CO. . . . NORFOLK, VA.
LAYNE-CENTRAL CO. . . MEMPHIS, TENN.
LAYNE-NORTHERN CO., MISHAWAKA, IND.
LAYNE-LOUISIANA CO. LAKE CHARLES, LA.
LAYNE-NEW YORK CO. . NEW YORK CITY.
AND PITTSBURGH . . . . . PA.
LAYNE-NORTHWEST CO. MILWAUKEE, WIS.
LAYNE-OHIO CO. . . . COLUMBUS, OHIO.
LAYNE-TEXAS CO. . . . HOUSTON AND
DALLAS . . . . . TEXAS.
LAYNE-WESTERN CO., KANSAS CITY, MO.
CHICAGO, ILL., MINNEAPOLIS, MINN. AND
OMAHA . . . . . NEBRASKA.
LAYNE-BOWLER NEW ENGLAND COMPANY,
BOSTON . . . . . MASSACHUSETTS.
INTERNATIONAL WATER SUPPLY, LTD.,
LONDON . . . . . ONTARIO, CANADA

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PUMPS & WELL WATER SYSTEMS

FOR MUNICIPALITIES • INDUSTRIES • RAILROADS • MINES AND IRRIGATION

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Your "Gold Mine" of Business Ideas

THE WALL STREET JOURNAL

PROFITABLE returns seldom materialize from fond hopes. Today's business is no exception. Policy-determining executives must have a balanced picture of the day's business news. Guesswork is costly in large scale merchandising drives.

There is no substitute for a dependable daily analysis of business and industrial news. That is why THE WALL STREET JOURNAL is indispensable to successful executives. This National Business Daily is your impartial observer of important developments in Business, Finance and Industry.

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Drawing Instruments, Slide Rules, Planimeters, Drawing and Tracing Papers, Drafting Room Furniture, Surveying Instruments, Tapes.

PIGMENT Waterproof Drawing Ink

in black and white and a wide range of opaque colors. Catalogue sent on request. Inquiries solicited.

F. WEBER CO. Est. 1853 — 227 PARK AVENUE, BALTIMORE, MD.

? *Better Industrial Location* ?

Suitable industrial sites. No labor problems. Excellent climate and water. 100% cooperation.

MARION BOARD OF TRADE

MARION, NORTH CAROLINA

While cosmopolitan in its general appeal, and modern *up to this moment* in its equipment, there is a peculiar flavor of The Old South here which Southerners are quick to note and appreciate. They feel at home and come back to us again and again.

Rates $3.00 *per day and up. Every room with bath or shower. Centrally located.*

The Southern Hotel
BALTIMORE

» » » *Finance* « « «
AND KINDRED SUBJECTS

Signs of Improvement

A number of signs point to somewhat better business. Dealers in building supplies anticipate increased sales resulting from the improved outlook and improvement in construction lines.

Lumber production has shown a slight gain, and while inventories of building supply houses are said to be large and bought at higher prices than now prevailing, optimistic sentiment is increasing.

Automobile manufacturers are calling men back to work as the production of new models gets under way. This has its effect on steel production, which has risen to a little over 40 per cent, and as this is written the next move is expected to show an increase in production.

While it is recognized the money being spent by government will be temporary in its effect, this effect has by no means been wholly felt as yet as activities in WPA, PWA, and FHA have not gotten in full swing. It cannot be denied, however, that business is waiting for more definite encouragement from Washington than recently has been indicated.

Railroad Wages

Following vain efforts by the Federal Mediation Board to arrange arbitration conferences between the Carriers' Joint Conference Committee and representatives of the Brotherhood of Railroad Trainmen, a nationwide strike vote has been ordered by the Brotherhoods.

In discussing the question of wage reduction earlier in the month, the Carriers' Joint Conference Committee stated that: "Railroad wage scales are at the highest average level in history, while the railroad industry is facing disaster. Railroad employees, for every hour on duty are now receiving wages 20 per cent higher than in 1932, although the condition of their industry is far more desperate today than it was then. The average weekly earnings of railroad men now will actually buy 27 per cent more in the way of goods and services than in 1929, which was the peak year of our national income.

"One-third of the rail mileage of the nation is now in bankruptcy. In the first quarter of this year more than half the country's rail mileage did not earn enough money to pay operating expenses and taxes. Almost 90 per cent of the mileage failed to earn enough to pay fixed charges. The net result of railroad operation in that period was a loss of more than $106,000,000."

Under the terms of the Railway Labor Act, after arbitration attempts by the Mediation Board break down, no change may be made in rates of pay, rules and working conditions in effect, or strike called for 30 days.

Unfair Law

Business is becoming increasingly insistent upon changes in the Wagner labor law. The hearings that have been held show the unfairness of a law that by its very nature places the National Labor Board, which is the judicial regulatory authority, in a position of prosecuting attorney. The law does not recognize the wrong done by employees, but attributes unfair labor practices, when they exist, solely to employers.

Views Of Credit Men

The National Association of Credit Men is of the opinion that the "present temper of the American people is unwilling to complacently continue much longer accepting theoretical reforms without carefully appraising their consequences. Sound judgment is beginning to return."

(Continued on page 50)

Progress means change.
Progressive power plant operators want greater efficiency and lower costs. NATURAL GAS is being used in many plants to get these results.

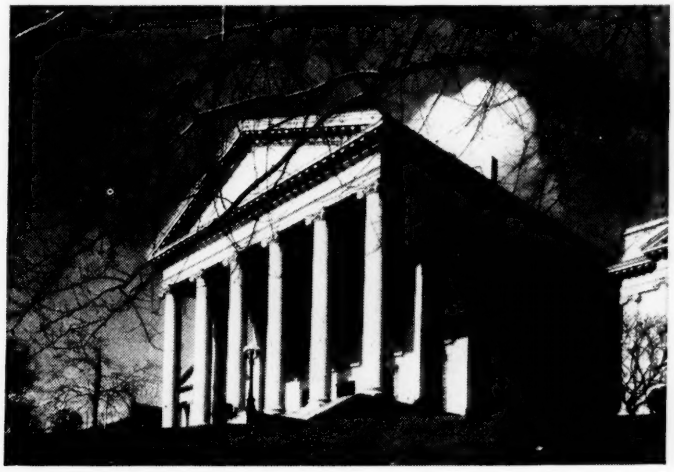
Its adaptability and flexibility let it fit into any modernization program.

Your local gas company will be glad to explain to you, the advantages of NATURAL GAS for your particular need.

SOUTHERN NATURAL GAS COMPANY

Watts Building, **Birmingham, Ala.**

MANUFACTURERS Who Wish to Avoid Congested Places



Industries seeking to get away from highly congested manufacturing communities, in line with the modern idea of decentralization, will find unusual opportunities in Virginia.

Many fine industrial sections which manufacturers can develop advantageously are well distributed throughout the State. Other major features of attractiveness to industries are: rail, water and highway transportation suitable for regional or national distribution; temperate climate, low taxes, native labor, and ample banking facilities at Virginia's largest bank.

Inquiries sent to First and Merchants will be given immediate attention.

FIRST AND MERCHANTS National Bank of Richmond

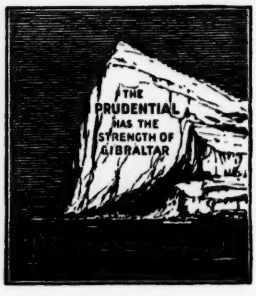
JOHN M. MILLER, JR., President

Capital and Surplus $5,700,000 • **Member Federal Deposit Insurance Corporation**

IF YOU HAD DIED ONE WEEK AGO

what income would your family have TODAY?

If in all fairness they should have more protection, ask for our literature on Monthly Income plans.



THE PRUDENTIAL
INSURANCE COMPANY OF AMERICA
EDWARD D. DUFFIELD, President
HOME OFFICE: NEWARK, N. J.

"Finance and Kindred Subjects"

Views of Credit Men

(*Continued from page* 48)

In evidence of this there are cited reasons for the opinion, and among these are the following:

The more radical labor program sponsored by certain irresponsible labor leaders is fast losing caste. There is a general note of skepticism over the long-range effects of the spending-lending program. The realization of an inevitable day of payment is looming larger. The value of relief work, accepted in an emergency, is now more generally doubted. The re-alignment of forces is noticeable in the political aspect of our national life. Men of long experience in politics are becoming closely wedded to the more conservative program.

New Private Financing

A new bond issue by Gulf States Utilities, subsidiary of Engineers Public Service Co., covering issue and sale of $10,000,000 of its first mortgage and refunding bonds, due October 1, 1966, has been approved by the Securities and Exchange Commission. The company plans to use the proceeds of the bonds for the refunding and discharging of outstanding liabilities, and part for the financing of its business as a public utility company.

Youngstown Sheet and Tube Co.'s proposed $30,000,000 financing plan was approved by stockholders on August 30, to provide funds for a $17,500,000 improvement program and to pay off $12,500,000 in maturing bank loans.

The Consolidated Oil Corporation has obtained a $25,000,000 loan from private sources and has issued notice to holders of preferred stock that it will redeem the entire outstanding issue. The new loan will run for twelve years and will bear an interest rate of less than 3 per cent.

Railroad Earnings Decline

A discouraging picture for the first half of 1938 shows Class I railroads of the United States, with a net operating income of $70,289,305, had an annual rate of return of 0.67 per cent on their property investment, This compares with 2.84 per cent in the first half of 1937.

The Southern district showing was somewhat better, being 1.36 per cent for the first six months as compared with 2.72 per cent last year.

Gross operating revenues of the country's carriers for the first six months declined $450,000,000 compared with the first six months of 1937, while operating expenses declined $220,000,000.

Europe Buying Gold

During the past month there was considerable increase in foreign purchases of gold on the bourses of Europe, besides an evident weakness of foreign currencies as compared with the American dollar. The reason given in press dispatches was fear of increasing German activities on the French and Czechoslovakian frontiers. Some observers of the European situation are of the opinion that the next 30 days will determine whether there is to be war or peace. Germany is reported to have assembled an imposing army of 1,000,000 men, reputedly for maneuvers. Fear is expressed that her activities close to the borderline of other sovereignties present a definite danger. England as peace-maker is having a difficult role.

Assets of Insured Banks Higher

According to the Federal Deposit Insurance Corporation, total assets of insured commercial banks were about $140,000,000 greater on June 1, 1938, than on December 31, 1937, although still more than $500,000,000 below the figure reported for June 30, 1937. Assets of these banks totaled more than $54,357,000,000 on June 30, 1938.

TANKS

Made to your specifications of steel, stainless steel, stainless clad, monel, nickel, nickel clad, copper, aluminum and alloy metals.

PLATE and SHEET FABRICATORS

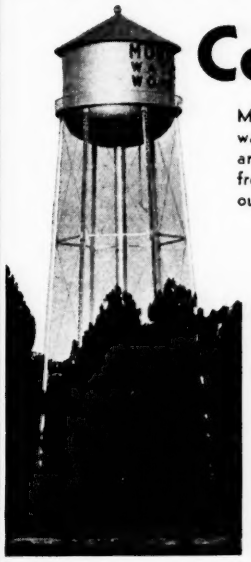
From 1/16" to 1" in thickness

Our 25 years of experience in fabricating pressure and non-pressure tanks, smoke stacks, smoke breechings, hoppers, bins, chutes, storage heaters, instantaneous heaters, condensers and kindred equipment is at your command.

RICHMOND ENGINEERING COMPANY Inc.
RICHMOND — VIRGINIA

Tank Builders For Over 80 Years!

Cities Served by Cole Tanks



An erection for Mobile Water Works

Many municipal or privately owned water works have had us build tanks and elevated towers to specification from their own engineer's design or ours. Some of the cities served are:

CHARLOTTE, N. C. (Million gallon tank)
CLEARWATER ISLAND, FLA.
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MOBILE, ALA.
McPHERSON, KAN.
ST. PETERSBURG, FLA.
ALBANY, GA.
GASTONIA, N. C. (Million gallon tank)
CEDARTOWN, GA.
SPARTANBURG, S. C. (Million and a half gallons)
NEWNAN, GA.

In addition to water tanks we also build tanks for acid, dye, oil, creosote, chemicals, etc., as well as other fabricated products of Quality steel and alloy steel plate. Let us figure on your requirements.

Write for "Tank Talk"—No. 8-D.

R. D. COLE MANUFACTURING CO.
NEWNAN EST. 1854 GEORGIA

STOP THE RAVAGES OF DRY ROT AND TERMITES

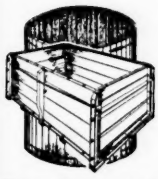
by pressure-treating your lumber and timber with ZMA or Creosote. Eppinger and Russell Co.'s preserving process increases the life of woods from 8 to 20 times. For more than half a century the outstanding utilities and industrial plants have depended upon Eppinger and Russell Co. for long-life, low-maintenance lumber that is immune to decay, dry rot and termite attack.

PRESSURE-TREATING PLANTS AT:
Jacksonville, Fla.
and
Long Island City, N. Y.

WOOD PRESERVERS SINCE 1878
EPPINGER AND RUSSELL CO.
84 Eighth Ave., New York City

WOOD TANKS

Wood Stave Pipe



Our products are designed, built and erected by experienced tank makers.

Tanks any size for all purposes.

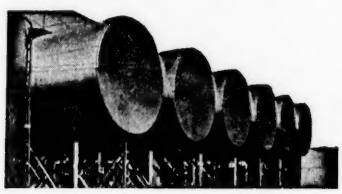
Towers any height for tanks.

Write for literature and prices.

THE BALTIMORE COOPERAGE TANK & TOWER CO.
Baltimore, Maryland
The Largest Works of Its Kind in the South

SOUTHLAND PRODUCTS

— WELDED OR RIVETED —



We now manufacture and offer to the trade tanks in all sizes for pressure or gravity work. Also other steel equipment of either

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This applies to field as well as shop built equipment.

Write us for information and quotations.

CHATTANOOGA BOILER & TANK CO.
CHATTANOOGA, TENN.

DAVIS CYPRESS TANKS

SAVE with CYPRESS

Long—lasting cypress, unequalled for low depreciation and various uses, is the wood used in Davis Tanks. For 50 years, Southern plants in all lines have been installing Davis Cypress Tanks and steel towers.

Now, the young Southern giant, the paper and pulp industry, is coming to us on an increasing scale.

Let us estimate on your tank needs.

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INDUSTRIAL NEWS

Power and Mechanical Engineering Exposition

The National Exposition of Power and Mechanical Engineering, Charles F. Roth, manager, Grand Central Palace, New York, is distributing a folder containing a partial list of exhibitors for the 13th National Exposition of Power and Mechanical Engineering to be held at Grand Central Palace from December 5 to 10, 1938, inclusive. Many outstanding industrial firms of the country are regular exhibitors at these expositions. A few choice exhibit spaces for the coming Exposition are still available, it is announced.

Anticipating an upswing in business activity during the coming fall and winter, exhibitors at the Exposition already are planning comprehensive and informative products displays. More than 230 leading manufacturers have already engaged space, and more than 40,000 registered visitors are expected.

New Roebling Pittsburgh Branch

John A. Roebling's Sons Company, Trenton, N. J., announces the establishment of a branch office and warehouse at 855 North Avenue, West, Pittsburgh, Pa., to carry a complete line of wire rope and insulated wire, including all grades of wire rope, electric wires and cables, flat wire, welding wire, steel and copper wire, Roebling Blue Center steel rope, etc.

Dr. Schuh Named Research Director

Dr. Arthur E. Schuh has been appointed Director of Research by the United States Pipe and Foundry Company of Burlington, N. J., according to announcement by the company. Specializing in physical chemistry, Dr. Schuh received his B. S. and Ph. D. degrees from the University of Chicago. Since 1929 he has been associated with the Bell Telephone Laboratories, New York, and prior to that with the Western Electric Company, Chicago. He is an active member of the American Society for Testing Materials and the American Chemical Society.

Connecticut Blower Appointment

Among other appointments announced by Charles H. Keeney, general manager of Connecticut Blower Company, Hartford, Conn., is that of Martin E. Marsalis of Fort Worth, Tex., as sales engineer for the State of Texas.

Flexomotives for Inland Steel

For service in its open hearth division, Inland Steel Company, Indiana Harbor, Ind., has ordered from the Plymouth Locomotive Works, division of the Fate-Root-Heath Company, Plymouth, Ohio, a 45-ton 320-horsepower direct drive Diesel Flexomotive. This locomotive, designed for direct drive up to 70 tons weight, has been under development by Plymouth Locomotive Works for several years and meets the demand, it is declared, for a heavy, flexible, mechanically driven internal combustion locomotive to eliminate costly electric drive. A 60-ton 6-wheel Flexomotive is now under construction by Plymouth for Inland Steel.

Largest Flying Tires

The world's largest airplane tires will be part of the equipment of the new Douglas DC-4, 42-passenger airliner soon to tour the country in test flights. Built by the B. F. Goodrich Co. of Akron, Ohio, the tires are five feet, five inches high and contain 45 miles of tire cord.

American Institute of Steel Construction

The sixteenth annual convention of the American Institute of Steel Construction, Inc., 200 Madison Avenue, New York, will be held October 11, 12, 13 and 14 at French Lick Springs Hotel, French Lick, Ind.

Republic Steel Distributor

N. J. Clarke, Vice President in Charge of Sales for Republic Steel Corporation, Cleveland, Ohio, announces the appointment of Todd-Donigan Iron Co., Louisville, Ky., as distributor of Toncan Iron Sheets.

Arthur W. Armstrong

Arthur W. Armstrong, president and director of The Wood Preserving Corporation, subsidiary of Koppers Company, Pittsburgh, Pa., died at a Chicago hospital on August 6. Born at Evanston, Ill., in 1885, Mr. Armstrong received his early education in Evanston and was graduated from Northwestern University in 1907. He held degrees of Bachelor of Art and Bachelor of Commerce. Soon after leaving college, Mr. Armstrong worked for the Chicago Northwestern Railroad for a time and then joined the Ayer and Lord Tie Company, becoming its president upon the death of Russell Lord, son of John B. Lord, founder of the company. During his presidency the Ayer and Lord Tie Company and Bond Brothers, Louisville, formed the Producers Wood Preserving Company. This company owned and operated treating plants at Louisville, Ky., and Montgomery, Ala. When Koppers acquired an interest in the Ayer and Lord Tie Company and a number of similar companies, it formed The Wood Preserving Corporation in 1930, Mr. Armstrong becoming vice president and member of the executive committee. He was made president in 1933. At the time of his death he was also president and director of the Carolina Wood Preserving Company, the Southern States Mineral Company and National Lumber and Creosoting Company. For the past fourteen years he had been director of the Service Bureau of the American Wood Preservers' Association.

(*Continued on Page 68*)

P&H ELECTRIC CRANES

—10,000 OF THEM

Last month the 10,000th crane left P&H shops. Though this is a small figure, when compared with automobile production, for instance, it is far and beyond the all-time production records established by any other crane builder. This, in turn, is concrete evidence of P&H's first half century of leadership in the overhead traveling crane industry. It is strong testimonial of the confidence you may have when you come to P&H for consultation on your specific handling needs. Harnischfeger Corporation, 4427 W. National Ave., Milwaukee, Wis.

Overhead Traveling Cranes, 1 Ton To 300 Tons.

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SPECIFY ORIGINAL SOLID CORRUGATED WIRE GLASS

It *diffuses* light with a minimum of shadows. *It is practically* self-cleaning and can be used on a roof of any material and supply daylight in manufacturing and industrial plants—an important factor in all modern production.

Also used with excellent results on sidewalls, marquises, canopies and wherever daylight is needed.

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WOLMANIZED LUMBER—
Decay and Termite Proof—Can Be Painted
Docks for Ocean Vessels

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Plants at: New Orleans; Winnfield, La.; Louisville, Miss. Savannah, Ga.; Jackson, Tenn., and Norfolk, Va.

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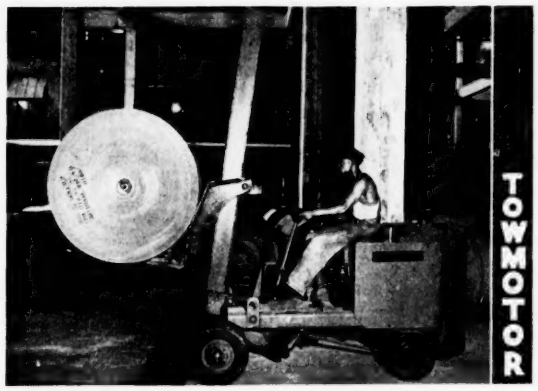

LEADS IN ALL INDUSTRIES

That may read like a strong statement, but it is factual and not an inflated claim. In every major industry where TOWMOTORS are used, they are acknowledged as being out in front—leading in durability, performance and economy.

Five minutes invested right now dictating a letter for bulletins and specifications may pay you unexpected dividends.

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Mr. E. Deane Harrington, 17 Guilford Avenue
Baltimore, Maryland. Phone: Plaza 4262.

L. S. Teague Equipment Co., 1331-1333 West Adams St.
Jacksonville, Florida. Phone: 5-4864.

McVoy-Hausman Co., 2019 Sixth Avenue North
Birmingham, Alabama. Phone: 7-5561.

Mr. James J. Alvarez, 408 Merchants National Bank Bldg.
Mobile, Alabama. Phone: DExter 5882.

C. G. Forshey, 909 M & M Building
Houston, Texas. Phone: Capitol 5525.

Wharton L. Peters, St. Louis Mart Bldg.
St. Louis, Mo. Phone: GA. 3050

TRADE LITERATURE

BOTTLERS TRUCK BODIES—
Folder—illustrated, devoted to Gar Wood bottlers bodies.
Gar Wood Industires, Inc., Detroit, Mich.

SUPEROCK JOISTS—
Joist Manual — illustrated, presenting information for designers, manufacturers, and users of Superock Joists.
The Superock Co., Empire Building, Birmingham, Ala.

AIR PORT FACILITIES—
Booklet—illustrated, telling how communities may have benefit of air facilities with Le Tourneau-built airports.
R. G. Le Tourneau, Inc., Peoria, Ill., and Stockton, Cal.

INDUSTRIAL RAILWAY CARS—
Bulletin 71—illustrating and describing the Koppel line of industrial railway cars and accessories.
Pressed Steel Car Company, Inc., Koppel Division, Grant Building, Pittsburgh, Pa.

REFRIGERATING EQUIPMENT—
Bulletin No. 201-C—"Ice and Frost," illustrating and describing Frick Float Valve Controls.
Frick Company, Waynesboro, Pa.

STEEL SHEET PILING—
Booklet — illustrated, describing various jobs on which steel sheet piling has been successfully used, including sewer work, waterworks projects, bridges, bulkheads, locks, cut-offs, etc.
The Corrugated Steel Sheet Piling Corporation, Builders Building, Chicago, Ill.

CLYDE WHIRLEYS—
Bulletin K-12—illustrating and describing Clyde Whirleys, traveling, full revolving, long reach, heavy duty steel derricks, with construction details and general specifications of the complete Clyde line; also shows construction projects and material handling operations at industrial plants.
Clyde Iron Works, Inc., Duluth, Minn.

PATROL SWEEPER—
Bulletin—illustrated, describing the Austin-Western Patrol Sweeper.
The Austin-Western Road Machinery Company, Aurora, Ill.

AUTOMOTIVE MAINTENANCE CLEANING—
Booklet—presenting modern methods for effectively handling the many necessary cleaning operations in conjunction with present-day automotive fleet maintenance and truck motor repairing.
Oakite Products, Inc., 22 Thames St., New York.

LOCALIZED LIGHTING—
Handbook on Localized Lighting—endeavors to present localized lighting in its proper relationship to general lighting, and outlines need of supplementary lighting in many production, assembly and inspection operations.
The Fostoria Pressed Steel Corporation, Fostoria, Ohio.

COST OF WATER HEATING—
Booklet—pointing out that inadequate piping may cause high fuel bills and suggesting means of efficient heating at minimum cost; publication is illustrated.
Revere Copper and Brass Incorporated, 230 Park Avenue, New York.

MILLER FLOORS—
Booklet—devoted to Miller Floors which were tested and used by U. S. Bureau of Standards as only magnesium oxide floors in its building; publication presents data with partial list of projects in which Miller Floors are used.
Building Products Corporation, National Press Building, Washington, D. C.

REPUBLIC ALLOY STEELS—
Handbook—replacing last (1935) edition of "Agathon Alloy Steels," presenting for the first time many features which should prove helpful to the metallurgist and student alike; in preparing the handbook, the Alloy Steel Division, Massillon, Ohio, of Republic Steel Corporation, has endeavored to keep it free from unrelated tabular material frequently found in engineering handbooks.
Republic Steel Corporation, Cleveland, Ohio.

ALLEGHENY STAINLESS STEELS—
Booklet—illustrating possibilities of stainless steels for consumer products and industrial applications, including brief summary of Allegheny Stainless Steel products carried in stock by Ryerson for immediate shipment.
Joseph T. Ryerson & Son, Inc., Chicago, Ill.

PROTECTING CONCRETE FLOORS—
Booklet—illustrating and describing Acme Floorsteel and telling how it will protect concrete floor areas, including aisles, runways and docks, from holes and general wear; showing installations in new and existing buildings to eliminate maintenance costs and reduce accidents.
Acme Steel Company, Chicago, Ill.

Florida
Beach Property
For Sale

Land & Lots
on Anastasia Island
near St. Augustine

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Investigate the possibilities of Beach property for development in Florida

Model Land Company
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NEW 1938
Register of Directors of the U. S. and Canada

Listing more than 85,000 directors . . . and 15,000 corporations . . . with a Geographical Supplement and Quarterly Cumulative revisions.

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DISCOVER for yourself the new-business value of this service.

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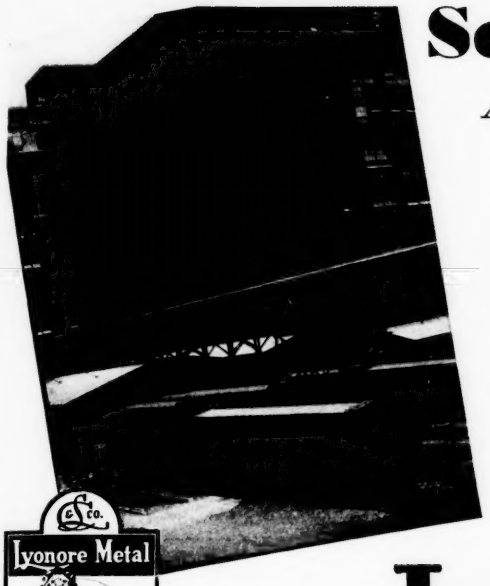

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Baltimore, Maryland

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It costs less because it lasts longer

Filtration and Pumping Equipment
For Water Works and Swimming Pools
Sales and Installation
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Water Filters for Municipalities, Textile Finishing Establishments, Rayon Manufacturing Plants, Swimming Pools, Raw Water Ice Plants, Laundries, etc.
ROBERTS FILTER MANUFACTURING COMPANY
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Water Purification Plants
Any Type—Any Purpose—Any Capacity
Dry Chemical Feed Machines
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E. W. BACHARACH & CO.
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STRUCTURAL STEEL
For Bridges, Buildings and All Industrial Purposes
Steel Plate and Miscellaneous Iron Work
Complete Stock Shapes, Plates, Sheets and Bars for Immediate Shipment
BRISTOL, VIRGINIA-TENNESSEE
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CONVERSE BRIDGE & STEEL CO.
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Structural Steel for all Industrial Structures, Buildings and Bridges.
LARGE STOCK FOR IMMEDIATE SHIPMENT

STRUCTURAL STEEL *for* BUILDINGS and BRIDGES
Capacity 1000 Tons per Month. 3000 Tons in Stock
Carolina Steel and Iron Company
The Largest Steel Fabricators in the Carolinas
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Metal Buildings *built according to* **A.I.S.C.** *specifications*

Modern interlocking steel covering on rigid structural steel frames . . . constructed in accordance with A.I.S.C. Specifications. May be easily and quickly remodeled or dismantled and re erected with practically 100% salvage. Insulation optional. Find out why Maryland Metal Buildings can be built and maintained at the lowest cost per square foot of floor space. Maryland Metal Building Co. Baltimore, Md.

Send for free illustrated Catalog

MARYLAND METAL BUILDINGS

Kentucky is Favored Field For Railway Purchases

(Continued from page 31)

school purposes. This amount, allocated to the public schools, is sufficient to defray the annual cost of educating approximately 39,000 children in the state.

According to the same analysis, 17.7 per cent of all 1931 railway taxes in Kentucky was used for highway purposes. Assuming that the same percentage applied in 1937, the amount of taxes paid by the railroads for the support of the public highways in Kentucky last year amounted to $686,000. The remaining 38.1 per cent, amounting to $1,477,000, was used to defray other costs of local and state government.

A third major contribution of the railroads to the economic well-being of Kentucky is in the capacity of employers. On July 1, 1937, Class I railroads operating in Kentucky and the Pullman Company were providing employment to 30,902 workers in the state. Including members of their families, they comprise a group equal to the combined populations of Frankfort, Bowling Green, Maysville, Paris, Elizabethtown, Glasgow, Henderson, Princeton, Owensboro, Fulton and Paducah. The railroads and the Pullman Company issued around 730,000 paychecks in Kentucky last year, and their total 1937 disbursements for wages in the state amounted to $45,800,000.

As with purchases, railway earnings govern railway expenditures for labor. Nearly 45 cents out of every dollar of railway revenues are paid out in wages, and payrolls rise and fall with railway earnings.

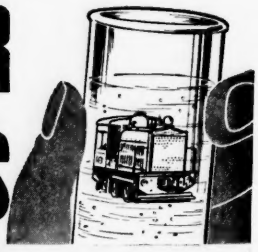
The importance of the railway payroll in Kentucky may be better understood when it is pointed out that the annual payroll of the average manufacturing establishment in Kentucky in 1935, excluding railway repair shops, amounted to approximately $43,500. Therefore, the railway payroll in Kentucky is equivalent to the combined payrolls of approximately 1,050 manufacturing plants.

Ten railway repair shops in Kentucky reported 6,660 workers and a payroll of $9,901,000 in 1935. According to the United States Census of Manufacturers, this was the largest payroll for any group of industries in the state. These railroad shops consumed fuel and materials valued at $7,121,000 in 1935.

Most important of all is the role of the railroads as providers of transportation service. This is their major function; indeed, it is their sole purpose in the economic scheme. Providing uninterrupted passenger, freight, perishable, express and mail transportation, serving farms, mines, quarries, mills, factories and hundreds of communities, day in and day out, month after month, year after year, each railroad is performing a service of fundamental importance to its territory.

Thus, as agencies of transportation, as purchasers of Kentucky products, as supporters of schools, highways, and state and local governments, and as employers of Kentucky workers, the railroads stand in the front rank among the constructive economic forces of the Blue Grass State.

EXAMINE YOUR HAULAGE COSTS



• You want haulage power that will handle your materials with dispatch at the lowest cost. It should be suited to your plant layout. It should be quick, flexible, easily handled, and economical for big or small loads.

Whitcomb Industrial Locomotives have been meeting those specifications in scores of industries for over sixty years. Whitcomb experience, and the quality of its engineering, result in more years of useful service, with lower upkeep expense. If you are using any other type of rail, or ground-contact haulage units, investigate the Whitcomb Locomotive. One man handles many loads at one time if desired, and there are no standby fuel losses.

Without obligating you, Whitcomb engineers will survey your haulage requirements and recommend the type and size of equipment that will serve you best.

Gasoline or Diesel Mechanical Drive

Gasoline or Diesel Electric Drive

Electric Storage Battery

Electric Trolley

THE WHITCOMB LOCOMOTIVE COMPANY

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Subsidiary of The Baldwin Locomotive Works. All Sales made by The Baldwin Locomotive Works, Paschall Station Post Office, Philadelphia, Pennsylvania.

WHITCOMB LOCOMOTIVES

Southern Pine and the Sulphite Process for Paper Making

Improved technique developed at the Forest Products Laboratory, U. S. Forest Service, Madison, Wis., makes less imperative careful selection of heart-free wood, heretofore a requisite for light-colored, bleachable sulphite pulp from such woods as Douglas fir, jack pine, and the southern pines. Wood containing considerable amounts of heartwood of the above species have produced satisfactory pulps by using the standard sulphite process under special conditions involving the use of high liquor concentration, extended penetration periods, and low temperatures in cooking the wood. These measures have tended to minimize the adverse influence of the heartwood, and in repeated instances gave satisfactory pulps from the standpoint of both yield and quality.

FOR THEIR GREATER SERVICE USE

SHIMER SUCCESS PLANING MACHINE KNIVES AND BITS,

Surfacing Knives and many Knives of smaller proportions for special duty in wood cutting. It will be to your advantage to look into this feature of our service. Our prices, too, are very attractive if you take in consideration their extra wear.

Samuel J. Shimer & Sons, Inc.
MILTON, PA.

CRUSHED STONE

Only highest grades of crushed
LIMESTONE AND GRANITE
Meeting all specifications

CAPACITY—8000 tons daily

Blue Ridge, Va. Pembroke, Va. Pounding Mill, Va.
Boxley, Greensville County, Va.

W. W. BOXLEY & COMPANY
Boxley Building, ROANOKE, VA.

GLAMORGAN
PIPE & FOUNDRY CO.
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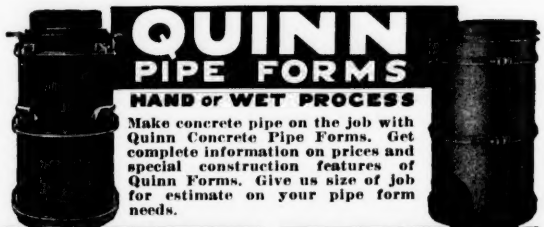
SAND—GRAVEL—BRICK
FILTER GRAVEL
Washed Sand and Gravel for Concrete Roads and Buildings
Filter Gravel, all sizes—Building Bricks
FRIEND & CO., INC. River St., Petersburg, Va.



QUINN PIPE FORMS

HAND or WET PROCESS

Make concrete pipe on the job with Quinn Concrete Pipe Forms. Get complete information on prices and special construction features of Quinn Forms. Give us size of job for estimate on your pipe form needs.

HEAVY DUTY

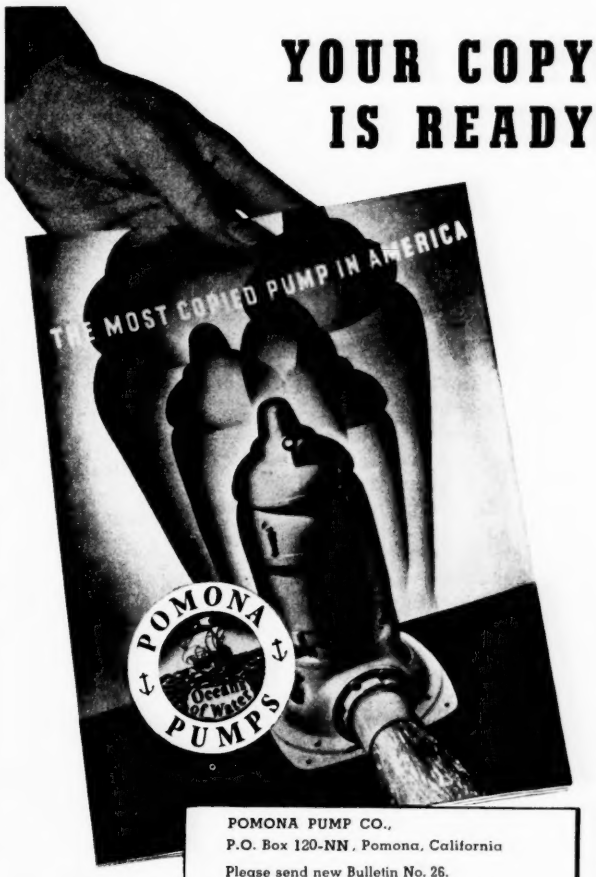
Built for more years of service—sizes for any diameter pipe from 12 to 84 inches—any length—tongue and groove or bell end.

MEDIUM DUTY

Makes same sizes pipe as "Heavy Duty" but built to meet demand for lower cost equipment to produce uniform quality in smaller amounts.

Also manufacturers of concrete pipe machines for making pipe by machine process.

QUINN WIRE & IRON WORKS 1605 12 St. Boone, Iowa



YOUR COPY IS READY

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POMONA PUMP CO.,
P.O. Box 120-NN, Pomona, California
Please send new Bulletin No. 26.
NAME
ADDRESS
CITY STATE

The latest engineering developments in deep well turbine pumps are presented by facts and pictures in this new Pomona bulletin just off the press.

For the reasons why you will save time and money by using Pomona Pumps, and for the story of how and why Pomona Pumps won leadership throughout the world—send for a copy of this book now. Remember that it's the way a pump works after you get it that counts for economy and durability.

POMONA
Water-Lubricated
TURBINE PUMPS

Group Hospitalization or State Medicine

(*Continued from page* 37)

concerned, it has been found that on a two year basis covering 450,000 people, 7.29 per cent of the males and 11.55 per cent of the females required hospitalization each year, making an average of 9.86 per cent per year of all subscribers. The approximate occupational classifications of members are: salesmen, clerks, and general white collar class, 50 per cent; industrial, 35 per cent and professional, 15 per cent. The industrial group varies from about 30 per cent to 50 per cent according to the region covered, while in certain rural areas there is a goodly enrollment of the farm population.

From the point of view of industry, group hospitalization is an important development. In recent years there has been a constantly growing tendency on the part of industrial concerns to maintain medical centers and welfare departments for employes and, in some instances, for employes' families as well. The expense of such an undertaking requires no emphasis, yet the procedure is continued because of its wide implications and general economic value. Regardless thereof, it is utterly impossible for it to be as inclusive as is necessary and equally impossible for it to become widespread. Consequently it would appear to be economically desirable from the viewpoint of both employer and employe that the former should acquaint himself with the details of local group hospitalization and see that the employe thoroughly understands the benefits to be derived and makes the decision to join or not join, a personal matter of the employe alone.

There is no doubt whatsoever that the need of medical care and its present high cost has *got* to be solved. It is equally certain that unless it is solved voluntarily, measures will be taken by the government to solve it by legislative action. That such is being contemplated already can be seen from the statement made recently by a high official of the Social Security Board to the effect that if group hospitalization is not widespread within a relatively short time, additions will be made to the Social Security Act to provide for it, in which case the greatest burden will fall on the shoulders of industry.

The Transportation of Petroleum

(*Continued from page* 35)

may consist of a different grade of gasoline or other petroleum product. The inter-communicating telephone, telegraph, or teletype system enables the dispatchers to keep the station operators informed of the time when each batch will reach them, and to give the necessary instructions for shunting off the different consignments to the connecting lines that will carry them to their different destinations.

Tank Cars and Motor Trucks

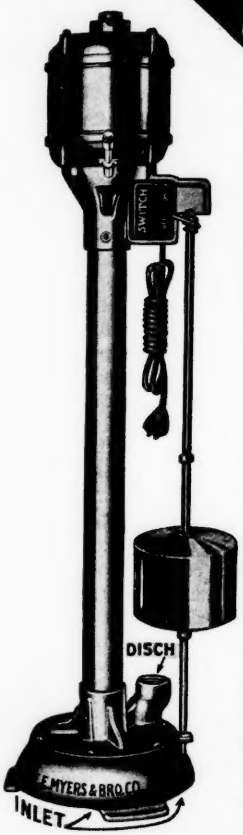
The first pipe line across the Alleghenies was built in the face of violent opposition on the part of the railroads who saw their revenues from the handling of petroleum products threatened by this new form of transportation. Today, in spite of the thousands of miles of pipe line, the railroads of the United States derive a revenue of more than $250,000,000 annually from the crude and refined products shipped by the petroleum industry. The industry owns or leases 150,000 tank cars to transport its products by rail.

The motor tank truck, a familiar sight on every street and highway, is the chief link between the industry's marketing terminals and the nation's 200,000 filling stations. Skillfully designed to provide a maximum of safety and efficiency in the handling of gasoline and other inflammable products, 40,000 of these trucks transport the never-ending supply of motor fuels and lubricants to the retail distributors. Other fleets, comprising 100,000 utility trucks, are used in other operations of the industry.

MUNDT
PERFORATED METALS
The few perforations illustrated are indicative of the wide variety of our line—*we can perforate almost any size perforation in any kind of metal or material required.* Send us your specifications.
Sixty-seven years of manufacturing perforated metals for every conceivable purpose assure satisfaction. For years we have specialized in supplying all kinds of screen plates to the pulp and paper industry.
Write for catalogue of Patterns
TIN, STEEL, COPPER, ALUMINUM, BRONZE, BRASS, ZINC, MONEL METAL, STAINLESS STEEL, ANY METAL, ANY PURPOSE
CHARLES MUNDT & SONS
90 Johnston Ave., JERSEY CITY, N. J

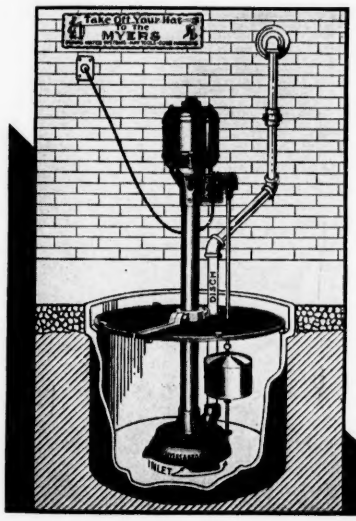
Masters of the craft for nearly sixty years—you may be sure your perforating problems are in safe hands when you give them to Erdle.
Whether your requirements call for aluminum, tin, zinc, brass, copper, steel, or another metal—Erdle can meet them. And meet them promptly—aided by large stocks of blank sheets kept always in readiness.
Send us your specifications for prices. Sample plate upon request.
ERDLE
PERFORATING COMPANY
ROCHESTER, N. Y.
"Master Metal Perforators to Industry"

It Drains when it Rains



MYERS CENTRIFUGAL SUMP PUMPS

At the turn of late winter into spring and from then on until summer arrives, flooded cellars and basements are common in most localities. Collectively, loss and damage throughout the country during this period is enormous, so let's not overlook the opportunity Myers Sump Pumps bring to you for profitable business at times like this. More dependable than ever, attractively priced, easy to install and operate, they automatically provide basement or cellar drainage that reduces excessive moisture or flood hazards to a minimum.



Thousands in service—there's no longer any question about their superior performance values. Already the demand is heavy. Write for catalog and information.

THE F.E.MYERS & BRO. CO.
ASHLAND, OHIO
PUMPS · WATER SYSTEMS · SPRAYERS · HAY TOOLS · DOOR HANGERS

PERFORATED METAL
of every sort

for Screening, Grading, Ventilating or any industrial purpose. Also Grilles of many beautiful designs.

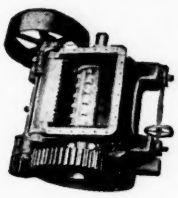
5631 Fillmore St., Chicago, Ill. New York Office: 114 Liberty St.

The Harrington & King Perforating Co.

PERFORATED METALS
Screens . . . . Grilles

Extensive facilities and long experience make Hendrick the logical source for all perforated metals . . . screen plate with any shape opening, round, square, hexagonal, squaround,* slotted, corrugated . . . heating and ventilating grilles of every description. Hendrick can furnish them in any desired commercially-rolled metal.
*Reg. U. S. Pat. Off.

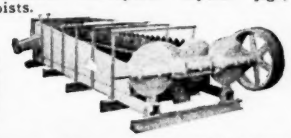
HENDRICK MANUFACTURING CO.
44 Dundaff Street, Carbondale, Pa.
Manufacturers of Mitco Open Steel Flooring, Mitco Shur-Site Treads and Mitco Armorgrids.



McLANAHAN EQUIPMENT

CRUSHERS
Single and double roll and jaw crushers, hammer mills, super dry pans—steel log washers and scrubbers, sand drags, revolving and vibrating screens, elevators, conveyors, dryers, jigs, hoists.

SCREENS
Complete portable, semi-portable and stationary crushing, screening and washing plants for different capacities of any materials.



McLanahan & Stone Corp. *Established 1835* HOLLIDAYSBURG, PENNSYLVANIA

LINK-BELT

CHAINS - SPROCKETS
ANTI-FRICTION PILLOW BLOCKS
POWER TRANSMISSION EQUIPMENT
ELEVATORS AND CONVEYORS

LINK-BELT COMPANY 5580-A
Atlanta, 1116 Murphy Ave., S. W.
Baltimore Dallas New Orleans Offices in Principal Cities

Vocational Training of North Carolina Youth

(*Continued from page* 36)

ing conditions are experienced by the girls spending some time in the cottage and, under supervision of the teacher, going through the experiences of housekeeping. In addition to the livingroom, diningroom, and bedroom, the cottage has one large work-room with unit kitchens arranged at different income levels, and machines and other equipment needed by the homemaker. This type of homemaking education is one of the most popular and valuable phases of the public school program in North Carolina.

These teachers of vocational subjects, employed for ten and twelve months per year have a fine opportunity to bridge the gap between the school and the homes of the students.

For a great many years after the inauguration of the program of vocational education in North Carolina the trade and industrial section confined its attention almost exclusively to part-time and evening classes for employed workers. The part-time classes are for those young persons who are employed but can get away for a few hours a week to attend classes organized and designed to increase their general intelligence or vocational efficiency. The evening classes are for mature workers and are held outside of working hours. The evening class instruction must be related to the daily employment of the worker enrolled.

The growth of this program from 5 classes with an enrollment of 128 students in 1918-19, to 611 classes with an enrollment of 10,190 students in 1937-38 is indicative of the interest of North Carolina in this program.

With the glaring facts brought out by the depression, showing the difficulty unskilled workers had in getting jobs and the demands of modern complex and highly specialized industry for trained workers, there has developed in the state a great demand for more day trade classes in the public schools. In North Carolina the smaller cities do not offer the best opportunities for the day trade classes because of the small demand for trained workers in any one trade. However, the program of diversified occupations does meet the need of a small town. This program provides for the student to spend one-half the day in store, shop or factory, and the other half day in school. A trained coordinator is employed who gives the related instruction to the group when they are in school, and keeps in touch with them at their places of employment to check on employment conditions, possibilities of exploitation, etc.

A program of distributive education is being organized under the provisions of the George-Deen Act of Congress by which workers in the fields of distribution are given instruction through part-time and evening classes.

The rehabilitation of civilian cripples is the responsibility of the Department of Vocational Rehabilitation of the Division of Vocational Education. Funds are provided by the Federal and State governments to find, retrain, and place in suitable employment those citizens of the State who, because of disease or accident, are disabled to the extent of not being able to earn a livelihood at their chosen vocation. Vocational rehabilitation involves contacting the cripple, and by individual study of the case, using various tests, determining the best training program. If physical restoration is necessary before the training program is begun, provision is made through clinical arrangements, hospitilization or by the provision of prosthetic appliances to meet this need. Then training arrangements, either through placement or institutional training, are made to give the trainee the kind of vocational education the individual survey indicates desirable. The case is not closed till the individual has completed training and is satisfactorily placed on a job and has become self-supporting.

For the year 1936-37, 312 cripples were completely rehabilitated in North Carolina at a combined cost to State, Federal and local communities of $99,052.78, which is just a little more than $317.00 on an average for salvaging these human wrecks and making them self-supporting, self-respecting members of society.

$900,000 Building at N.Y. World's Fair uses

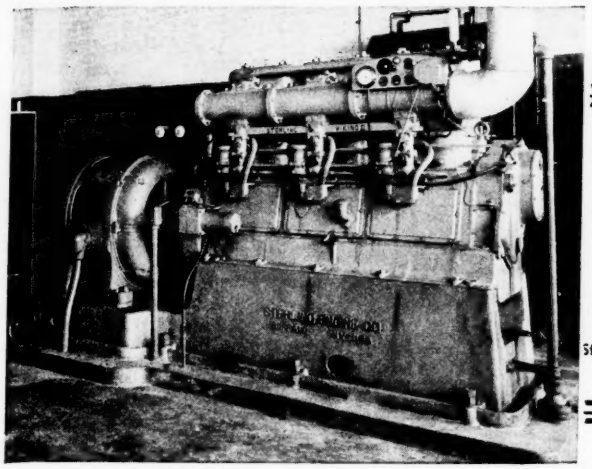
TRADE FRICK MARK

Keeping 700 executives and staff people comfortable in 112 separate offices, as well as when 500 of them have lunch in the cafeteria, is a job for any air conditioning system. Especially when the building, administrative center for the 1939 World's Fair, spreads over 1⅓ acres, and is divided into 5 zones. Each zone has its Frick Refrigerating System for air conditioning.

Let us quote on that special air conditioning, refrigerating or ice-making job of yours. Write

FRICK COMPANY
Waynesboro, Penna.

Air Conditioning



Sterling
THE ENGINE OF REFINEMENT

SHUSHAN (NEW ORLEANS) AIRPORT employs 200 K.W. Emergency Generator Set driven by

Sterling Viking 6-cylinder 425 H.P., 1200 R.P.M. Engine, direct connected to 200 K.W. General Electric Generator for standby.

STANDBY POWER

Quick starting engines are needed to supply emergency power when storms or mechanical failures interrupt utility current. Many Sterling Engines serve faithfully and immediately, providing electricity so quickly that the outage is scarcely noticeable. The data compiled as a result of these installations is available on request.

STERLING ENGINE COMPANY

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1270 Niagara Street
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Dept. C-7

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Quality Dependability Service

ON YOUR NEXT ORDER

Made to order Cold Upset and Rolled Thread products by Progressive are assurance against time and labor troubles in assembly operations. It will pay you to consult our specialists before placing your next order. Their suggestions may show you the way to greater fastening economy.

QUALITY PROMCO BRAND

The PROGRESSIVE MFG. CO.
TORRINGTON · · · CONNECTICUT

for Joining and Repairing

CONVEYOR BELTS

FLEXCO HD

BELT FASTENERS **RIP PLATES**

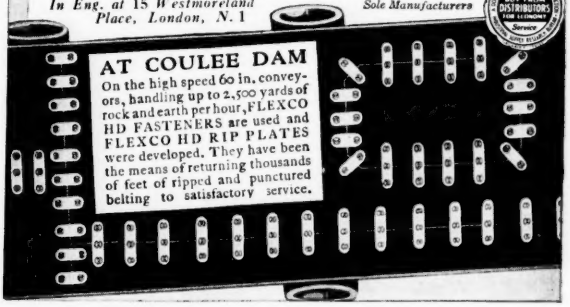
U. S. Pat. 1,382,709

FLEXCO HD BELT FASTENERS make a tight butt joint of great strength and long life. Recessed plates embed in belt, compress belt ends and prevent ply separation. Five sizes in steel and alloys.

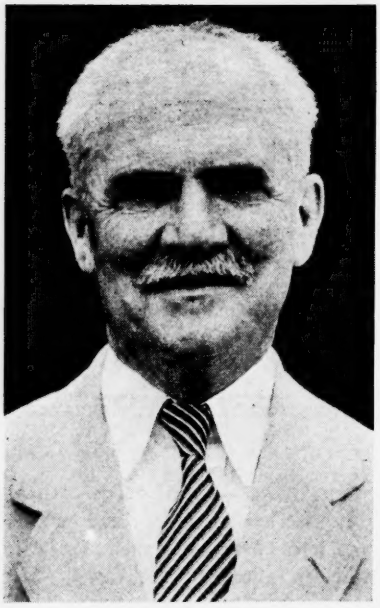
FLEXCO HD RIP PLATES are used in repairing rips and patching conveyor belts. The added width gives a desirable long grip on the edges of the rip. Consultation on belt joining and repair invited. Sold through jobbers and belting houses the world over.

FLEXIBLE STEEL LACING CO.
4690 Lexington Street Chicago, Illinois
In Eng. at 15 Westmoreland Place, London, N. 1 *Sole Manufacturers*

Stock FLEXCO BELT & RIVET DISTRIBUTORS FOR ECONOMY Service



AT COULEE DAM
On the high speed 60 in. conveyors, handling up to 2,500 yards of rock and earth per hour, FLEXCO HD FASTENERS are used and FLEXCO HD RIP PLATES were developed. They have been the means of returning thousands of feet of ripped and punctured belting to satisfactory service.



George R. Rayner

George R. Rayner, Executive Vice-President of the Carborundum Company died at his home in Lewiston Heights, August 15th after an illness dating back to July 1937.

Mr. Rayner was born in Northampton, Mass., August 6, 1871 and has been connected with The Carborundum Company since August 1898. Shortly after the World War in 1919, he was elected Vice-President of the company, which position he held until his death.

During his forty years with the company he was active in developing the abrasive industry and has made hundreds of friends among the officials of the country's greatest industries.

Banks Can Help in Development

That the South offers unusual advantages to industry is becoming more widely recognized every day. Industrialists and engineers who search for facts that are vital to industry find here a wealth of raw material found nowhere else in America. Ideal conditions exist for plants of many kinds, due to the gifts of nature in material resources of field and mine and forest, with a climate that provides longer working days and more of them than those of other sections.

It will be a great day for the South when these facts are believed and acted upon to a greater extent by the Southern people themselves. In the face of the remarkable progress the South has made, there are too many Southerners willing to accept the view the South is a problem of the nation. As a matter of fact, the growth of the South has outstripped other sections during the depression, and while it has problems of various kinds, all states, all cities, all communities have problems. The South is no different in that respect, nor is it worse.

Thought is directed to these things by an advertisement that appears in this issue by one of the leading banks of the Southern states—the First & Merchants National Bank of Richmond—an institution whose business it is to study facts.

The First & Merchants National Bank of Richmond takes occasion to show industry the attraction and opportunities presented in Virginia, in line with the decentralization of industry away from congested centers which is receiving the close attention of industrialists of today.

Bank advertising has too long been given over to cut and dried phrases of security, safety and service, which means what it may, but tells very little of the spirit of progress activating a community and the opportunities that await the investment of capital. Other banks will find in this suggestion a field deserving of their thought and action. Such progressive moves help not only the bank itself, but all of the bank's customers and the community at large.

The wealth that nature have given the South, making it capable of supplying mankind's necessities, offers a creative opportunity even under present conditions that may well be considered. If the outstanding enterprises of the South, not only banks but other institutions that have their future staked upon Southern progress, would realize what could be accomplished by a united movement to tell the world what the South has, the effect would be immediate and far-reaching.

EARLE GEARS
Cut Spur, Bevel, Herringbone, and Worm Gears
All sizes. Every description. Operating Machinery for Bridges, etc. "Les Simplex" Cold Metal Saws.
The Earle Gear & Machine Co.
4719 Stenton Ave., Philadelphia, Pa.
110 State St., Boston, Mass.
149 Broadway, New York City

GALVANIZING
(HOT DIPPED PROCESS)
The largest job galvanizing plant in the United States
GALVANIZED PRODUCTS FURNISHED
Joseph P. Cattie & Bros., Philadelphia, Pa

Pumps—Deep-Well Plunger and Turbine
Strainers—and other well supplies
WATER PRESSURE SYSTEMS
A. D. COOK, Inc.
Lawrenceburg, Indiana

CANNING MACHINERY
FOR
FRUITS · VEGETABLES · FISH · CITRUS FRUITS · ETC.
A.K. ROBINS & CO. INC. BALTIMORE, MD.
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Direct from Manufacturer to Consumer
GLUE-LOCKED ENVELOPES
PLAIN and PRINTED
All Sizes and Styles
OLES ENVELOPE CORP.
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